School Shop

vol. XIII no. 5

JANUARY 1954

T & I Teachers Must Be Tradesmen
by Gerald B. Leighbody

Model Railroading in the School Shop
by J. A. Walker

Electronics Can Be Taught in the General Shop
by William H. Mason

Plastic Book Ends
by Charles W. Beard

Cover story: Student interest in model railroading can be utilized to teach much about electricity and woodworking. For a description of such a program see page 8 inside.

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

You get all 3 with B-G
"SOFT-TEXTURE" LUMBER
The dollars you spend on lumber are going farther—doing a better purchasing job—when they get you:
1. Good lumber—specially selected—high grade
2. The kind that speeds the progress and advancement of the student because of its easy and accurate workability, good sanding quality, ability to hold glue, take beautiful finishes
3. Immediate delivery
You enjoy all these important advantages —regularly, consistently—with B-G kiln dried lumber. It's the top favorite in schools in over 70% of the states—and many foreign countries.
Order B-G "Soft Texture" lumber today from your 1954 B-G Catalog. Include with it your order for any machines, equipment and supplies you need. This Master Catalog describes and illustrates more than 15,000 items. One-source buying saves time, money and unnecessary paper work.
B|G
BRODHEAD GARRETT CO.
4560 E. 71 ST. CLEVELAND 5, OHIO
"EVERYTHING IN INDUSTRIAL ARTS SUPPLIES"

School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

Vol. XIII, No. 5 JANUARY 1954

CONTENTS

T & I Teachers Must Be Tradesmen.....Gerald B. Leighbody 7
Another viewpoint on the efficacy of tests for determining trade competency.

Model Railroading in the Shop.....J. A. Walker 8
Much can be learned by students when their interest is motivated by model railroading.

Plastic Book Ends.....Charles W. Beard 9
A prize-winning plastic project.

House-Number Bracket.....Louis J. Siy 10
An excellently designed project for the metal shop.

A Dual-Purpose Unit.....Weldon Shepard 11
A combination blackboard and storage unit which really saves space.

Electronics Can Be Taught in the General Shop.....William H. Mason 12
How the inexperienced teacher in electronics can introduce a unit in a general shop.

Handy Apron for Drafting Teachers.....Kenneth Maxwell 14
A device that will save steps.

Ladies' Leather Purse.....James H. Bailey 15
Leatherworking will arouse your students' interest.

AVA Attracts Thousands to Chicago Convention..... 18
A report on the 1953 meeting.

Storage of Color Plates for Patent Bases.....Irving J. Sanders 19
How one teacher solved a print-shop storage problem.

Bottle Bases for Liquids.....J. James Hasenau 22
Spilled glue or other liquids can be kept to a minimum by these devices.

REGULAR FEATURES

School Shop Talk..... 2
"Art" and Industrial Arts.

Shop Tickler..... 11
Too Long to Measure!

School Shop Kinks..... 16
Short cuts for doing shopwork.

Strictly Personal..... 20
About your fellow teachers.

Here Is a Way..... 20
How to publicize your program.

News..... 24
Happenings of interest to shop teachers.

Diamond Dust.....Thomas Diamond 26
Come, Let Us Colloque!

Project Design..... 28
What the industrial designers are doing.

Instructional Resources..... 30
The latest in books, pamphlets, and audio-visuals.

News from Industry..... 34
New products and teaching aids. Send in a card today.

From Washington.....Michael Paca 40
News from the Nation's Capital.

Index to Advertisers..... 40

Editor and Publisher
Lawrence W. Prakken

Chairman, Editorial Board
Thomas Diamond

Associate Editor
Jerome C. Patterson

Assistant Editor
David Perkins

Advertising Production Manager
Dorothy J. Buffington

Circulation Manager
Barbara N. Leake

•

EDITORIAL ADVISORY BOARD

J. L. Anderson, Principal, San Jose Technical High School, San Jose, California.

D. Arthur Bricker, Supervisor, Industrial Arts, Cincinnati, Ohio.

R. Lee Hornbake, Professor of Industrial Education, University of Maryland, College Park.

Franklin J. Keller, Principal, Metropolitan Vocational High School, New York City.

H. H. London, Professor of Industrial Education, University of Missouri, Columbia.

W. E. Lowry, Dean, School of Education, Sam Houston State Teachers College, Huntsville, Texas.

John A. McCarthy, Assistant State Commissioner of Education, Vocational Division, Trenton, New Jersey.

M. J. Ruley, Supervisor of Industrial and Vocational Education, Tulsa Public Schools, Tulsa, Okla.

G. Harold Silvius, Chairman of the Department of Industrial Education, Wayne University, Detroit, Mich.

Joseph R. Strobel, Assistant Commissioner for Vocational Education, New York State Education Department, Albany.

Gordon O. Wilber, Director, Division of Industrial Arts, State Teachers College, Oswego, New York.

J. C. Woodin, Director, Industrial and Adult Education, Wichita, Kansas.

•

MEMBER OF

EDUCATIONAL PRESS ASSOCIATION OF AMERICA

Editorial and Business Office: 330 South State Street, Ann Arbor, Michigan.

Manuscript Information: Manuscripts are paid for at regular space rates and should be addressed to the Editor, School Shop, 330 South State Street, Ann Arbor, Michigan.

Subscription Rates: $3.00 a year; Canadian, $3.00 a year; foreign, $4.00 a year. Single copies: 40 cents each except April which is 50 cents. Special group rates for students in teacher-training institutions will be given on application.

Postal Information: Acceptance under section 34.64, P. L. and R., authorized.

Advertising Sales Offices:

Chicago 4, Illinois—R. L. (Les) Gray, Western Manager, 53 West Jackson Blvd., Suite 740, telephone Harrison 7-9659.

New York 17, N. Y.—Macintyre-Simpson & Woods, 101 Park Ave., telephone Lexington 2-8998.

Ann Arbor, Mich.—Jerry Patterson, Mid-West Manager, 330 South State St., telephone Normandy 8-7205.

Publication Information: Published monthly, September through June, at Mount Morris, Illinois. Printed in the United States of America. Copyright 1953 by Lawrence W. Prakken.

We Don't Have to Be Clever to Write Ads About Books Which Sell Themselves

—but we do have to let you know that our regular

30-DAY ON APPROVAL PLAN will allow you to judge these

Three New Tech Books

for yourself

1. APPLIED PSYCHOLOGY FOR EMPLOYEES

Lawshe-Thomas

A remarkable, long-awaited turnabout, this concise booklet, directed to the employee and the potential employee, epitomizes all that is human behavior and guides the way to better relations through the knowledge that comes from understanding the employer and the fellow worker. **(Price not determined)**

2. MACHINE SHOP OPERATIONS AND SETUPS

Porter-Lawshe-Lascoe

Easy to read and well illustrated, this book provides complete coverage of fundamentals plus a detailed and specific exposition of the operation and setup of all machine tools. Also contains job classification breakdown for the student machinist. **(Price not determined)**

3. DIESEL AND HIGH-COMPRESSION GAS ENGINES —FUNDAMENTALS

Kates-Stafford

A clearly written book covering all phases of the diesel and the high-compression gas engine. Construction, fuel injection, auxiliary systems, and operation and maintenance are among the subjects comprehensively treated by two outstanding authorities in the field. **(Price not determined)**

Request copies on approval today

Gentlemen:

Please send me on 30-day approval copies of those books indicated by the numbers circled below:

1. 2. 3.

Name .....

School .....

Address .....

City .....

Zone..... State.....

AMERICAN TECHNICAL SOCIETY

Dept. W-481

848 East Fifty-eighth Street

Chicago 37, Illinois

School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

"Art" and Industrial Arts

Art is a wonderful thing, but it has different meanings for different people. In *Webster's Unabridged Dictionary* we find thirteen points of view expressed, so one has a broad basis from which to choose when he elects to discuss the subject. For this reason, we venture to examine the field of industrial arts in the hope that we may find that the type of work carried on in this area of education actually possesses the qualifications that entitle it to use the term "arts."

In the history of education we read of the "Manual Labor Movement." Later on someone disliked the idea of "labor" being carried on in the school, so they started a campaign which led to the abolition of "labor" and the introduction of the term "training." This new title of "Manual Training" appeared to be acceptable for a number of years until one day someone with an aesthetic soul proposed that the work done in school shops be more dignified. As a means toward this end, he proposed that the title then in use be changed to "Manual Arts." Thus we progressed from the dim past of yesteryear to the relatively modern idea that school shop work is "Art," a fact that should be indicated in the title.

One would think that, having achieved the purpose of having their work labeled "Art," the brethren would have been satisfied. But no. Somehow or other the adjective "manual" offended some of those with artistic tendencies. So again, by some political maneuvering, they finally succeeded in thrusting on an unsuspecting public the current title of "Industrial Arts."

Now there are just as many definitions for this term in vogue today as there are in Webster for the word "Art." However, the one that intrigues us at the moment is that the industrial-arts program is one in which the industrial arts of printing, metalworking, plastics working, etc., are used as mediums by means of which pupils learn. While this definition may not be acceptable to some, it serves to indicate that art is present in the program somewhere. But, the question naturally arises, where is it?

Here again we refer to Webster to find that art means "skill in performance." If this be accepted, considerable evidence of its presence may be observed in the host of beautiful objects displayed in the Ford Industrial Arts Awards program and in the exhibits of pupils' work shown at some of our professional conventions. It is true that the skeptic can find many horrible examples of craftsmanship if he looks over the field as a whole. But it would be foolish to maintain that we can bat a thousand percent in the matter of excellence. We can say with assurance that the general average of good craftsmanship is exceedingly high. Moreover, the examples in which a lesser degree of skill is displayed may indicate a fine artistic achievement for the particular individuals who were responsible for them.

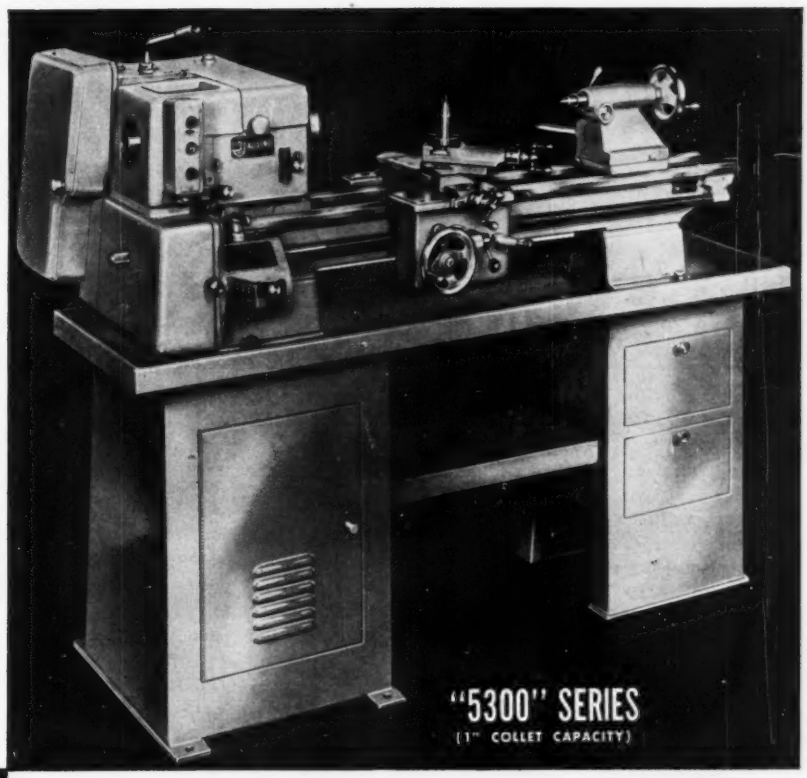
Another definition of art which may be used by some in evaluating the work done in the school shop is "the application of skill to the production of beauty, according to aesthetic principles." If this be the criterion on which our work is judged, it is possible that we do not rate as high as we believe we do in the example given above, although we do find many projects in which evidence of aesthetic appreciation appears with varying degrees of success.

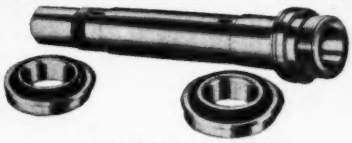
Not only so, but the vast number of projects which may lack aesthetic appeal in some respects cannot be discounted entirely. There is always the possibility that, poor as these may be, they may have served to increase immeasurably the aesthetic appreciation of the pupils who made them.

There are still eleven definitions of art which we have not considered. However, the two we have mentioned give rise to the belief that there really is some art in industrial arts, and that the brethren who introduced the idea of its presence in the title of our type of education cast a new light on school-shop work. Since we believe this to be true it behooves each teacher to keep the fact clearly in mind, and to strive with all his might to maintain and improve the standard of art in his work to the end that, more and more, the contribution of industrial arts to the development of art appreciation and design fundamentals may be more generally recognized and achieved.—*T.D.*

MASSIVE NEW 12" CLAUSING

with Safety + Efficiency + Economy +



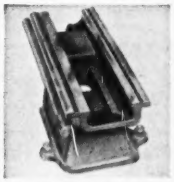


"ZERO-PRECISION" BEARINGS
Precision ground, forged steel spindle turns on widely spaced heavy-duty Timken "Zero-Precision" tapered roller bearings — bearing run-out tolerance is .00015.

QUICK CHANGE MECHANISM
Provides instant selection of 48 threads or feeds. ½" wide steel gears. Ground shafts turn on ball bearings. Plunger-type selector control.

CLUTCH AND BRAKE EQUIPPED COUNTERSHAFT
Friction clutch-brake permits instant starts and stops of spindle without stopping motor. Belts are fully guarded.

LARGE TAILSTOCK
Heavy-duty tailstock has No. 3 MT ram with tang socket. Swing-type wrench, permanently attached, controls bed lock.



PRECISION GROUND BED
Massive, semi-steel bed is 7⅜" wide, 5⅛" deep — thickly ribbed and braced. Vee-ways, flat ways and undersides are ground. Built-in screw-type leveling jacks.

most practical LATHE for student training

The new CLAUSING "5300" is the most practical 1" collet capacity lathe for vocational training . . . at or near its price. It has *Safety Plus!* Belts, pulleys, shafts and gears are fully guarded . . . headstock hood will not open unless clutch is disengaged, and clutch will not engage unless the hood is closed . . . and conveniently located controls. *It has Efficiency Plus!* It's a husky lathe, ruggedly built to handle every job faster, more accurately . . . has bigger spindle and tailstock ram for wider work range . . . big graduated dials and big controls for faster setups. And it has *Economy Plus!* It's low in cost, both initial and operating . . . and it's low in maintenance cost . . . a heavy-duty precision lathe built to withstand years of round-the-clock production use. Its simplicity of operation saves time for teachers and students alike. The new CLAUSING "5300" is by far —

the biggest PLUS in lathe history!

In addition to the important features highlighted at left, it has: heavy diamond bored headstock . . . precision cut gears throughout . . . double-walled automatic apron with oil bath lubrication . . . 12 speeds, 29 to 1300 RPM . . . instant selection 48 threads or feeds . . . steel-cable B-belt drive . . . hand fitted headstock, tailstock, carriage . . . new heavy steel plate pedestal base and pedestal cabinet. It will be well worth your time to write for full details about this great new lathe, and compare, feature by feature!

Prices start at $715.00 F.O.B. Factory ILLUSTRATED literature on request.

CLAUSING DIVISION
Atlas Press Company
1-122 N. PITCHER ST., KALAMAZOO, MICHIGAN

Atlas CLAUSING — PRECISION MACHINE TOOLS — ATLAS PRESS COMPANY, KALAMAZOO, MICHIGAN U.S.A.

STANLEY SHOP TALK

NEW BIT GAUGE

The Stanley #47 — A fully adjustable bit gauge that will not mar any surface. When the hole is bored to the depth wanted the gauge end touches the work. If boring continues this flexible spring bends — but it won't mar the surface.

BIT BRACE & AUGER BIT

The Stanley "100 PLUS" #100 — The Russell Jennings auger bit shown here is ideal for use with the 923 Brace. Shop-tested and proved, this double threaded screw point bit bores easily and cuts a smooth, accurate hole.

The Stanley "100 PLUS" #923 — This brace features the new, built-in Self-Centering Chuck that makes bit centering automatic and positive. It holds any size auger bit and straight shank drills from ⅛" to ½".

HAND DRILL

The Stanley "100 PLUS" #610 — A compact drill for wood and metal. It has enclosed gears so there's no place to catch hands and clothing and the chuck is locked to the spindle by a snap ring which prevents threading off. Here's a *really* boy-proof drill.

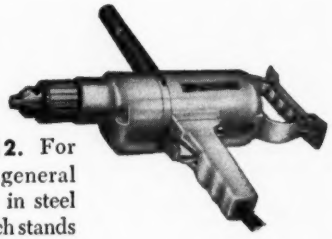
"YANKEE"® PUSH DRILL

The Yankee "100 PLUS" #41. The mechanic's friend, this sturdy all metal tool is ideal for shop use. Bores smoothly with a one-hand drilling action. The drill point in use is locked in. Drills from 1/16" to 11/64" (by 64ths) are stored in the magazine handle.

ELECTRIC DRILL

The Stanley #235. A fistful of power, the "Mighty Midget" is light enough for the smallest boy in the class — 8⅛" long and only 3⅜ lbs. This is the most powerful drill of its size . . . drills ¼" in steel and ½" in hard wood. Full ball-bearing. Available in six different speeds.

ELECTRIC DRILL



The Stanley #112. For heavier work; this general purpose drill cuts ½" in steel and 1⅜" in wood. Bench stands are available for this, and all Stanley Electric Drills.

Use this coupon for more detailed information and school shop help

STANLEY TOOLS, Educational Dept. C, New Britain, Conn.

FREE ( ) Please send me the Stanley Educational Dept. News
FREE ( ) Please send me Stanley Tool Catalog No. 34
FREE ( ) Please send me the Stanley Electric Tool Catalog
FREE ( ) Please send me "Yankee" Screw Driver Chart No. Y43

25¢ each
15¢ in lots of 10 or more

( ) Please send the Stanley Tool Guide. The Tool Guide contains 38 charts, perforated and punched for 8½" x 11" notebooks. They cover all the common woodworking tools and many metalworking tools... hundreds of illustrations.

NAME .....
SCHOOL .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

STANLEY

TOOLS

STANLEY®

HARDWARE
ELECTRIC TOOLS
STEEL STRAPPING
STEEL

Want to Cut Shop Equipment Cost?

THIS NEW 16" BAND SAW

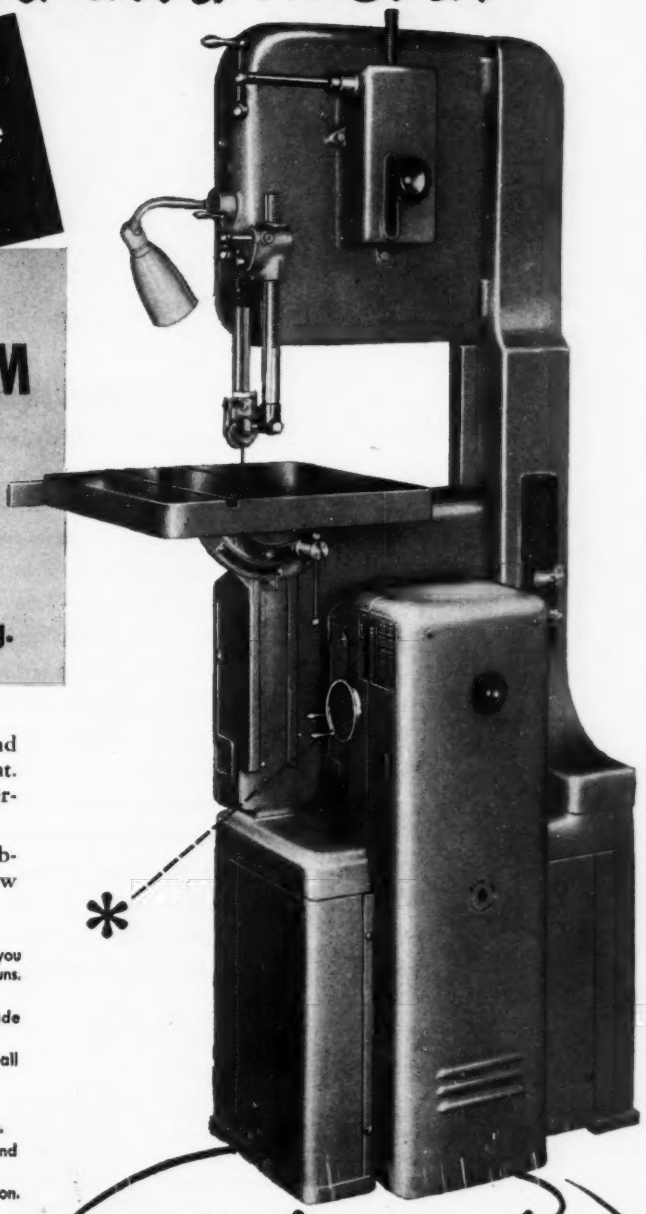
Cuts both wood and metal

...cost little more than single purpose machine

SPEEDS 50 to 4500 SFM

...Just turn* wheel to speed wanted

...while saw runs. No belt or pully changing.



No longer do you need to tie up funds in *two* band saws to get both wood and metal cutting equipment. This new Walker-Turner *Light-Heavyweight* is a perfect answer for *both!*

Your local factory-trained Walker-Turner distributor is ready to tell you all about its remarkable new design features:—

***Quick-change Variable Speed Drive.** As easily as dialing a radio, you turn the hand wheel and change blade speed *smoothly*, while machine runs. Speed shows on a graduated scale.

Safer Operation . . . no need to expose belts or pulleys to change blade speed.

Improved Saw Guides. Upper and lower leaf type . . . adjusts to all blade widths.

Carter Jiffy Tires for longer life, smoother operation.

Capacity: — Blade to frame 16 in. Upper guides to table, max. 8 in.

Other Plus Values: — New base, extra weight, new rigid frame and body design, available accessories, etc.

GET ALL THE FACTS. Just phone Walker-Turner Distributor or send coupon.

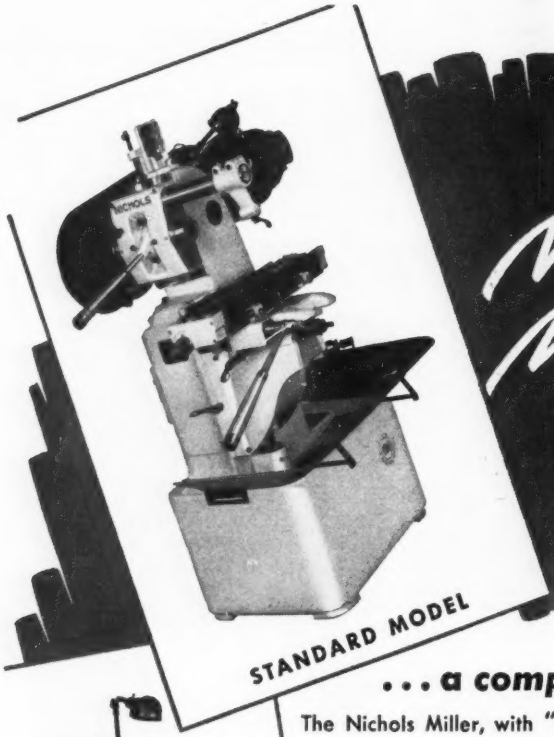
WALKER-TURNER
walker-turner DIVISION
KEARNEY AND TRECKER CORPORATION
PLAINFIELD, N. J.

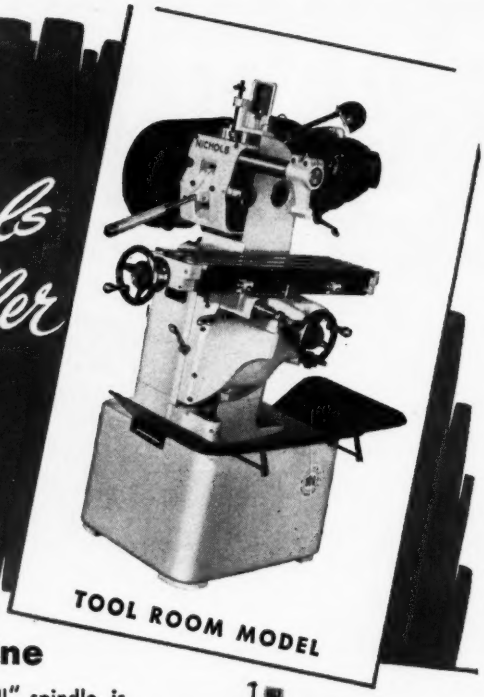
DRILL PRESSES — Hand and Power Feed • RADIAL DRILLS • Wood and Metal Cutting BAND SAWS • TILTING ARBOR SAWS • RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS • BELT AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES

. . . . *Use this space* . . . .

to send for full details and specifications.
Walker-Turner Division, Kearney and Trecker Corp.
Educational Dept. SS-1, Plainfield, N. J.

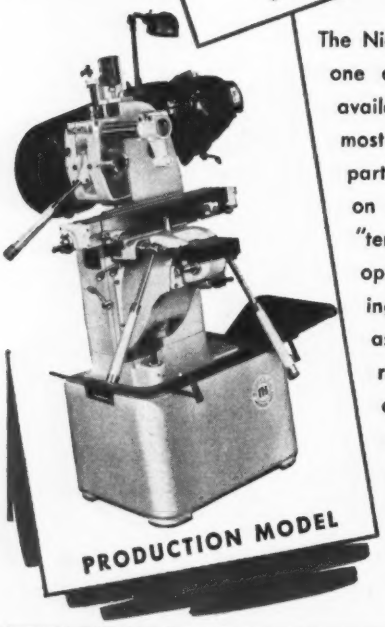
Nichols Miller

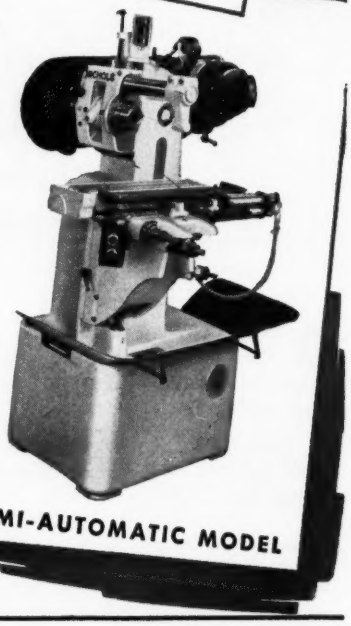




. . . a *complete* line

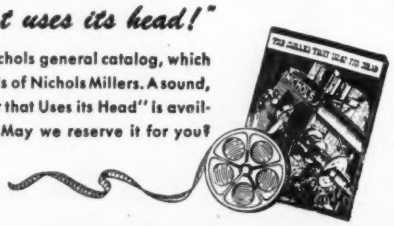
The Nichols Miller, with "rise-and-fall" spindle, is one of the most precise, universal machines available today. The four models shown, fill most basic requirements—whether for single parts with simple set-up, or multiple operations on mass production jobs with tolerances to "tenths". Their versatility makes possible such operations as facing, boring, recessing, turning, slotting, key seating and contour milling, as well as regular milling. According to requirements, screw or lever longitudinal and transverse table feeds are available optionally. "The miller that uses its head" is your best choice—and one of industry's greatest values. If you want production to "tenths", investigate the Nichols Miller.





"the miller that uses its head!"

Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie "the Miller that Uses its Head" is available for free showing. May we reserve it for you?



CONDENSED SPECIFICATIONS

Table Working Surface	6¾" x 21" or 30"
Longitudinal Travel (screw or lever)	10" or 19"
Transverse Travel (screw or lever)	7"
Vertical Travel — Knee	13½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1250 lbs.

MANUFACTURED BY W. H. NICHOLS COMPANY WALTHAM, MASSACHUSETTS

NATIONAL DISTRIBUTORS **NICHOLS-MORRIS CORPORATION**

76-L MAMARONECK AVE. WHITE PLAINS, N. Y.

The discussion continues:

T & I TEACHERS *MUST* BE TRADESMEN

Says Gerald B. Leighbody

Assistant Superintendent for Vocational and Practical Arts Education, Buffalo, New York, Public Schools

AN article in the November issue of SCHOOL SHOP carried the title "Must T and I Teachers be Tradesmen?" The author concluded that it is not necessary to be a tradesman in order to teach a trade, and suggested that graduates of programs designed to prepare for the teaching of industrial arts can successfully teach a skilled occupation.

To ask the question, "Must an individual be a tradesman in order to teach a trade?" is equivalent to asking "Should an individual be a surgeon in order to teach surgery?" To suggest that a college-trained industrial-arts teacher who has "worked in industry during the summer" is qualified to teach an occupation on a vocational basis is somewhat like suggesting that surgeons be trained by outstanding graduates of a pharmacy school, or by recent graduates of a medical college who have assisted in a few operations. Such a practice would be a clear case of the blind leading the blind.

The Smith-Hughes Law Settled It

The question as to the necessary qualifications for teaching an industrial occupation on a vocational basis was settled long ago by those who drafted the Smith-Hughes law. Section 12 of the law states that teachers shall be persons "who have had adequate experience or contact in the line of work for which they are preparing themselves as teachers." If there was any doubt that this experience was intended to mean actual occupational experience as an employed worker, this doubt was removed by the wording of regulations in *Vocational Education Bulletin No. 1* governing the administration of vocational education, issued by the United States Office of Education. This wording has been repeated in each succeeding revision of this bulletin. The most recent revision of 1948, in referring to the training of vocational-industrial teachers, states, "Such training shall be given only to persons who have had adequate vocational experience in the line of work for which they are preparing themselves or who are acquiring such experience." Vocational experience does not mean a few hours, or a few hundred hours, of activity in the shop of a teachers college. It means employment as a full-time paid worker in the occupation to be taught.

In recognition of these facts, 50 (or all) of the states and territories surveyed by Earhart in her recent study of certification requirements for trade teachers were found to require trade experience of persons who are to prepare for the teaching of trade shop subjects.* The length of experience required ranges from three to eight years among the various states.

Experience in operating programs since the passage of the Smith-Hughes act has tended to confirm, rather than to cast doubt on, the validity and wisdom of requiring that an individual who is to teach an occupation shall first of all be an experienced and successful practitioner of that occupation. There is no substitute for such experience. Least of all is an in-school training in the industrial-arts shop of a teachers college a substitute for such experience.

Tests Can't Measure Competence

It is a great error to assume that any type of test yet devised, performance or otherwise, can measure the occupational competence of a prospective teacher. At best such a test can sample (and in a limited way) only the ability of a candidate to operate certain machines, handle certain tools, or answer certain technical questions connected with an occupation. Knowing *about* an occupation is far from being competent to teach it. The most important aspects of occupational competence are not revealed by such tests, and can be understood only through rich and fairly lengthy experience as a mature worker in the occupation.

Among these are the countless practical situations which arise in the day-to-day practice of an occupation and which require those adaptations and modifications of skills and technical knowledge which are never encountered in an industrial-arts teacher-education institution. Those who have had most experience with trade competency tests will testify that they serve only as one means of final checking on the skills gained through extensive occupational experience.

As to the length of occupational experience needed to become a master of the trade to be taught, it is not necessary to quibble about the meaning of the term "adequate" in the Smith-Hughes law. Length of experience alone is not the sole criterion of mastery. There is a difference between five years of experience and one year of experience repeated five times. The range, quality, and intensity of the experience are among the important factors. Common observation, and particularly the honest recollection of those who have mastered a trade, will attest that a reasonable range and quality of such experience cannot be achieved short of several years of employment in an occupation. There are few occupations of a skilled or technical nature which would not require a minimum of five years for reaching the occupational maturity which is the hallmark of the successful vocational teacher.

Vocational Education Will Collapse

If the time ever comes when trade courses are taught by those who are not qualified tradesmen, the whole carefully built structure of vocational-industrial education will collapse. Indeed, it will not deserve to survive, for it will have forfeited the confidence, first, of employers; second, of organized labor; and third, of the students. How long will students respect the instructional leadership of a teacher who pretends to pre-

*Cecelia R. Earhart, *Requirements for Vocational Teacher Training and Certification in Trades and Industries in the Various States and Territories*, Pittsburg, Kansas: Kansas State Teachers College, 1946.

pare them for a world of work in which he himself is a stranger?

The direction taken by the program of industrial arts in recent years makes teachers now preparing to teach it less qualified than ever to teach vocational courses. Vocational education, by and large, has remained faithful to its historical and original objectives. Its principal objective is to prepare youth and adults for useful employment, or for their improvement in their present employment. Much of the remarkable success which the program has enjoyed can be attributed to holding fast to this objective.

Industrial Arts Is Unsure of Itself

Industrial arts, on the other hand, has never been and is not now quite sure of its objectives. Of one thing, however, it seems to be certain, and that is that it is no part of vocational education and has no vocational objectives. Some of its most prominent leaders have been very vocal in disassociating the program from the program of vocational education. This vacillation and uncertainty in the philosophy of industrial-arts education has naturally been reflected in its programs for preparing teachers. These programs have progressively deemphasized the importance of manual skills, and have watered down the quality of technology — the two touchstones of modern skilled trades and technical occupations.

We may assume that those being prepared to teach industrial arts in present-day teacher-education institutions are being well trained for the kind of teaching service which their program presently requires. As such they have the full respect and confidence of their professional colleagues, the vocational teachers. The two should and do live and work together and supplement one another's efforts, just as both live and work together with teachers of English, science, physical education, and music.

To assume, however, that a preparation for the teaching of industrial arts, augmented by a smattering of part-time work experience, constitutes proper preparation for the teaching of a vocation, is to be seriously mistaken indeed. Let us not violate the integrity of either program by acting on such an assumption. ★

EDITOR'S NOTE: Mr. Leighbody's article is typical of several others that were received in reply to Mr. Vezzani's article but space will permit the publication of this one only. We are delighted that there has been such a response by letter and manuscript, both favorable and unfavorable, to the procedure outlined by Mr. Vezzani.

Classes work as shifts in making up this model railroad layout to simulate work in industry.

Model Railroading in the Shop

By J. A. Walker

Ponca City, Oklahoma, Junior High School

MODERN educators recognize the value of working in groups. As the average shop routine usually calls for individual work, we have been casting about for plausible situations involving group work in our electricity shop. I believe our model railroad is a partial solution to this problem.

We started about a year ago with an investment of $25.00 in a locomotive kit, a box-car kit, and a few lengths of track. We mounted our layout temporarily on an old woodwork bench. The track was laid in a 4′ circle with one turnout and siding. Here we learned to lay track, developed a dependable power supply, and limbered up our new locomotive.

At the beginning of the fall term, the project was outlined to the various classes, and volunteers were accepted to begin the planning of a permanent layout. Our first step was to chalk on the floor a rough full-scale sketch of the proposed layout, and from this the shape and size of our table was planned.

While a group of seventh-grade boys worked on the table, another group of ninth-graders were designing and building a power supply. Work was passed on from one class group to another, thus simulating shift work in an industrial plant.

Track work and wiring were entrusted to ninth-grade boys. Ours is a relatively simple layout, yet wiring can become quite complicated. Direct-current power with its reversing switches, block breakdown to prevent shorts, and control switches for remote operation of turnouts, all add up to a sizable mass of wiring. The boys worked in pairs on the wiring and if a mistake was made it was corrected before I was called in to check the work.

Rough track work gave us the most trouble, along with defective commercial turnouts; but we are now able to operate a train around the main loop at full throttle without derailment. We found that short-radius curves are to be avoided. The minimum radius depends on the equipment to be used on it, but our Mantua shifter with a short string of cars will negotiate a 14″-radius curve at medium speed.

We had a train running in time for "Back to School Nite" and needless to say the railroad was the center of interest for most visitors, and of course the young operators were proud as peacocks.

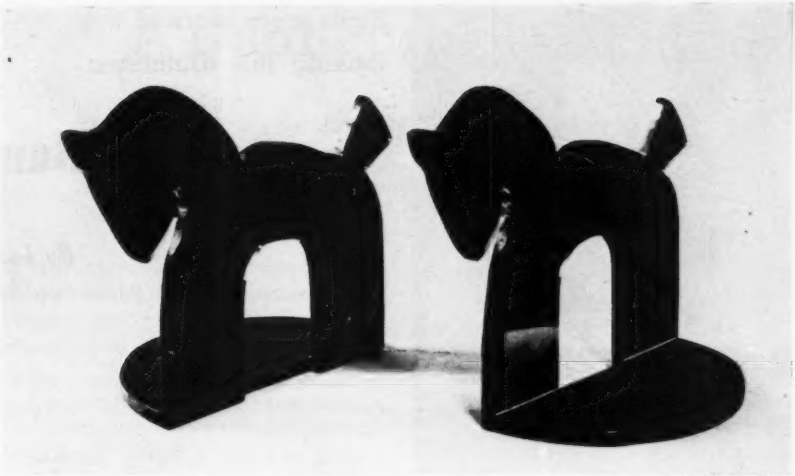
About a dozen boys worked both during regular class periods and before

(*Continued on page* 39)

Junior-high students will like these

Plastic Book Ends

By Charles W. Beard
Spaulding High School, Rochester, N.H.



Ford Motor Co. Photo

A simple functional design characterizes these plastic book ends made by an eighth-grade student. The project won a place award in the Ford Industrial Arts Awards last year.

THESE plastic book ends are excellent as an introductory project in plastic work for the junior-high student. We like to keep beginning projects rather simple so as to avoid waste as students learn how to use the material. Later on when they become more proficient they can make larger items.

The design of this project makes it suitable for beginners and yet allows for originality as various animal or figure designs may be used. The method of drawing full-size patterns on graph squares makes such a procedure practical. Variations in the design such as joining the two figures with a narrow rectangular piece make the project suitable as a napkin holder or letter holder.

In our general shop, the work in plastics, copper, and aluminum is combined into a general unit called crafts. This is preceded with a brief unit on tin-can work which is intended to provide experience in using tools and so cut down the waste on the more expensive materials used in the craft unit.

Before the student uses plastic material, he is required to do some reading about plastics and make a brief report about them so that he will understand better the new material with which he is working.

Acrylic plastic is used because of the ease with which it may be worked, cemented, and formed. This project gives excellent experience in choosing proper colors, laying out a pattern, sawing, filing, smoothing, buffing, polishing, and cementing. The design is simple and functional and avoids the gaudiness of some plastic projects.

The construction steps for the project are as follows:

1. Choose 3/16″ or ¼″ plastic in the color desired.

2. Draw a pattern on graph squares and then trace on the masked covering of the plastic sheet.

3. Cut out the two figures with a jig saw or, if hand tools are used, with a jeweler's saw. Do not cut the base pieces until the ends are finished.

4. File the edges and then carefully scrape with a knife or glass before sanding.

5. Lay out and cut the base pieces to fit the width of the end pieces which may vary in size because of the scraping and sanding.

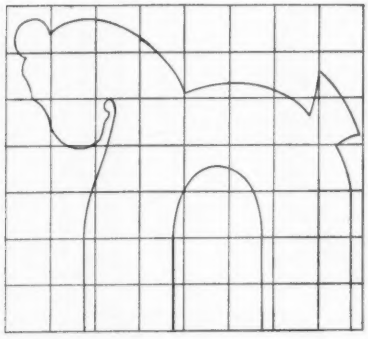
6. File, scrape, sand, and check the base piece for size.

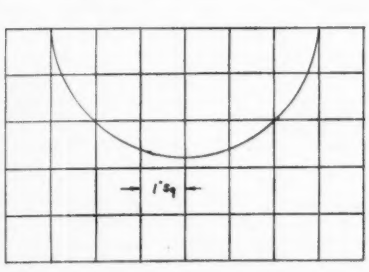
7. Remove just enough masking paper along the edges so that the cementing may be done.

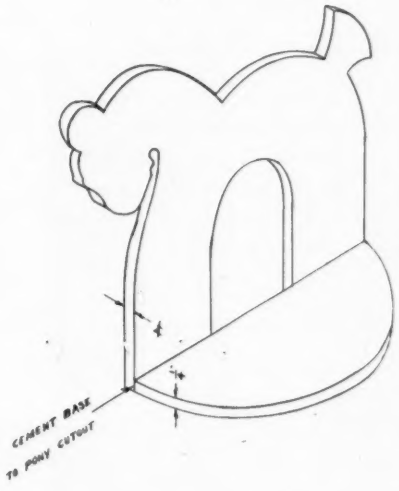
8. Make a cementing jig by fastening together two rectangular blocks that are slightly longer than the book ends. Be sure that these form a true right angle.

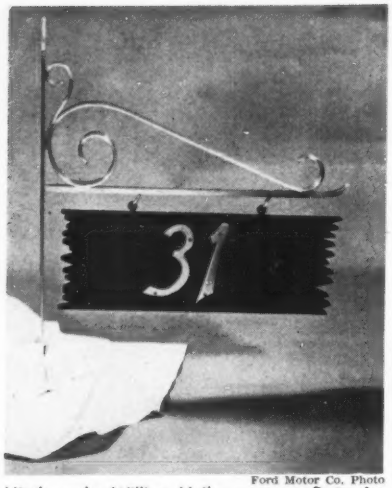
9. The cement may be applied with a small brush or the dipping method may be used. The softened surfaces are then pressed firmly together in the jig with wedges used for applying the pressure. Proper bonding is important, of course. We allow the cement to set overnight.

10. Remove the masking paper, clean with a good cleaner, and then polish with plastic wax, using a soft lint-free cloth. ★









Ford Motor Co. Photo
Ninth-grader William Heilmann won a first prize in the Industrial Arts Awards with this project.

Skills were learned making this aluminum

House-Number Bracket

By Louis J. Siy

William S. Hackett Junior High School, Albany, New York

ONE of the students in my ninth-grade industrial-arts sheetmetal class needed a house-number bracket for his home, so motivation for this project was ready-made. The problem of constructing the bracket of aluminum and wood was a challenge to the boy's ability which he immediately accepted.

Prior to beginning work with the materials, the boy prepared a working sketch, a list of tools and materials to be used, and a brief outline of the processes required.

Each part was made in a predetermined sequence so as to facilitate assembly of one part to a previously made part. This procedure enabled the pupil to check his work as it progressed. The parts were made in the following order:

1. The back support (*A*) was laid out, cut out, filed, drilled, countersunk, and all surfaces finished.

2. The square arm support (*B*) was laid out, one end filed and formed, drilled, tapped, and assembled to the back support (*A*).

3. The small scroll (*C*) was laid out on paper, material cut and corners filed, all surfaces finished, the scroll formed, holes laid out, drilled, tapped, and assembled to the back support (*A*).

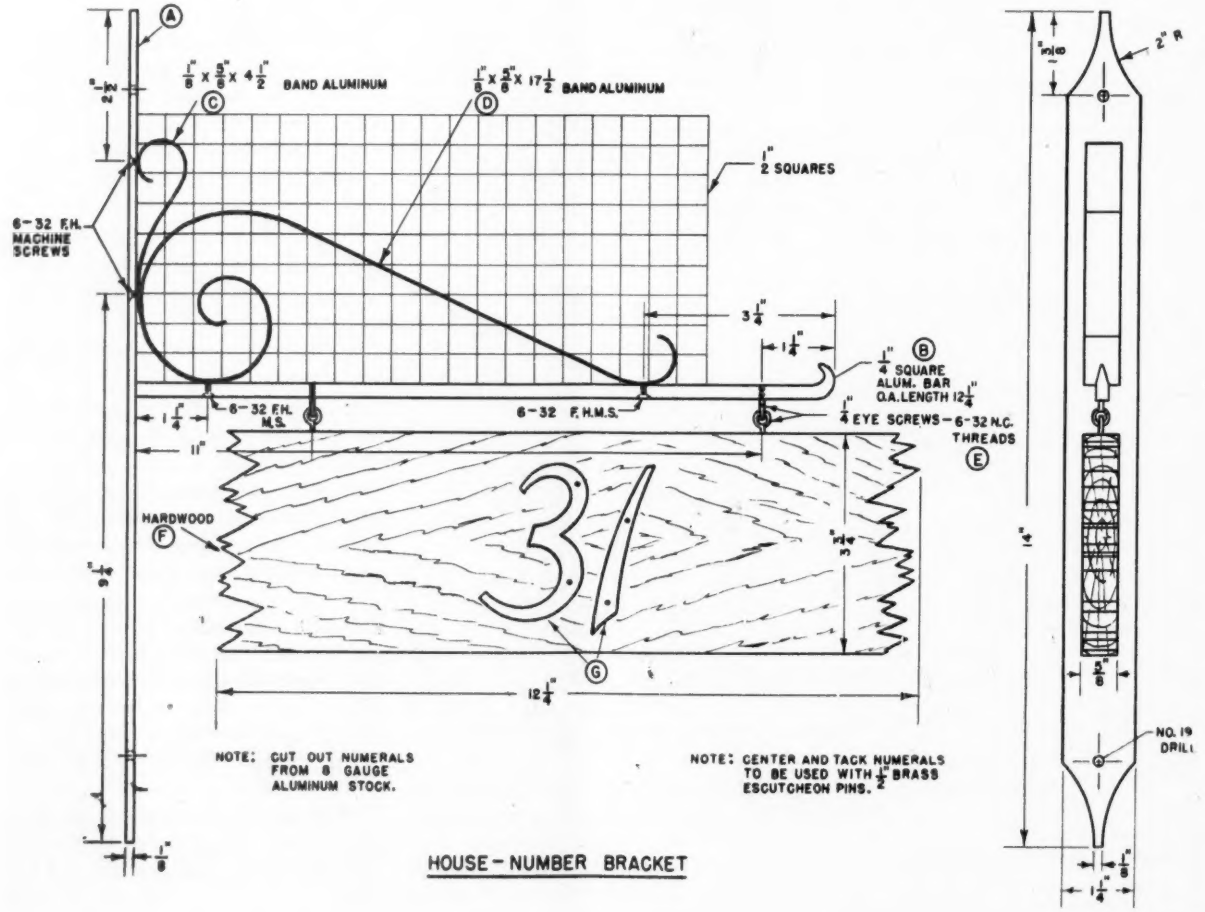
4. The large scroll (*D*) went through the same procedure as for the small scroll and in addition was assembled to square arm support (*B*).

5. The eye screws (*E*) were formed, threaded, and assembled to square arm support (*B*).

6. The hardwood plaque (*F*) was laid out, cut out, drilled, eye screws attached, and finished with one coat of shellac and two coats of spar varnish.

7. The numerals (*G*) were laid out,

(*Continued on page* 11)



HOUSE-NUMBER BRACKET

cut out, filed, surfaces finished, drilled, and assembled to wood plaque.

8. The assembly was completed with the joining and closing of the screw eyes.

9. The project was completed with a final touch-up finish given to all surfaces marred in the assembly process.

The construction and planning of this project presented a number of learning opportunities for the pupil. These included the laying out, filing, and finishing of soft aluminum; cutting out irregular shapes from heavy-gage aluminum with a piercing saw; forming scrolls with band aluminum; drilling, countersinking, and tapping threads in aluminum; forming eye screws with aluminum wire; cutting threads with a die; cutting, shaping, and finishing hardwood; and assembling a number of individual parts into a single unit.

From the standpoint of the instructor the project served a very useful purpose in developing skills in working with aluminum as well as knowledge about the metal and appreciation of its properties. Desirable behavior changes were also brought about in the pupil. ★

Shop Tickler

Several years ago when I was teaching woodshop we were doing some maintenance, repairing a broken door. We sent a boy out to measure the door so that he could get out stock.

He was gone only a short time when he returned, looking puzzled. On questioning, he protested that he was unable to measure the door. It was wider than 24" and he only had a two-foot rule!—*Herbert W. Yankee, Stratford, Conn., High School.*

[Ed. Note: Readers are invited to contribute short humorous items, illustrated or not, from their teaching experience to this new department of School Shop.]

A Dual-Purpose Unit

By Weldon Shepard

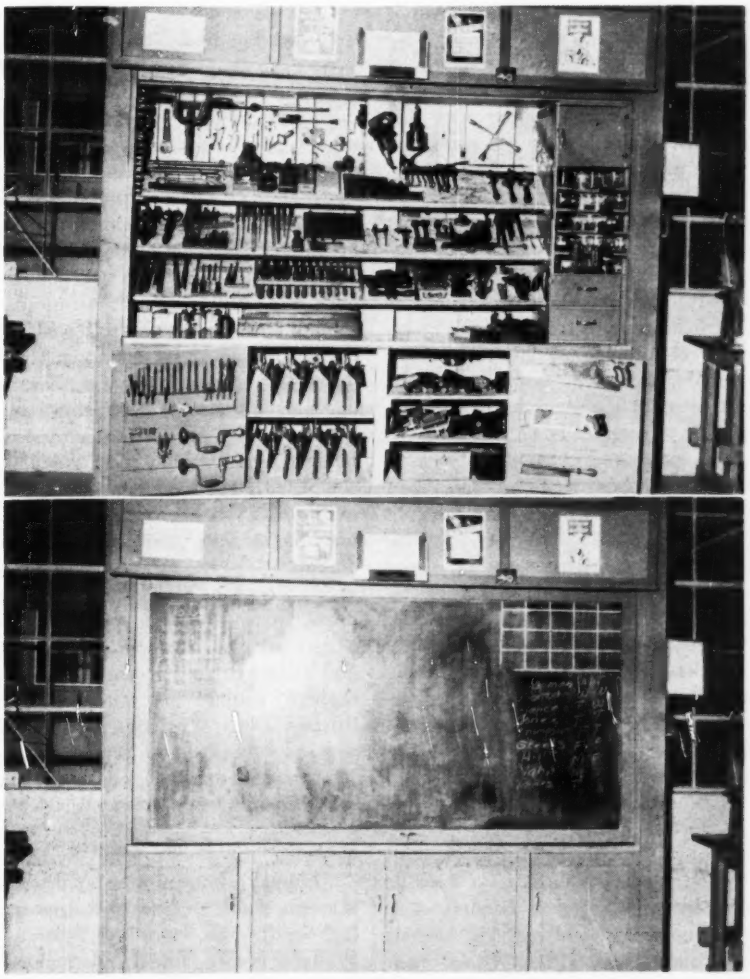
Palmyra-Macedon Central School,
Palmyra, New York

FOR convenience and practicality I have found the combination tool storage and instructional blackboard shown below of exceptional value in my shop.

The top photograph shows the exposed tool panel and supply cabinets with the blackboard pushed up. The advantages of this panel and cabinet type storage are obvious, I believe. I do, however, want to point out a couple of interesting features. Notice the eight boxes in the open cabinet of the top picture below. These contain tools that are used at the woodworking benches. On the door of the cabinet are all the boring tools and bits and braces. The open cabinet opposite it is used for tool storage and on the door are the various type saws. The two cabinets in back of the open doors store power tools and some of the larger tools that are not needed so often in the shop.

The bottom photograph shows the same storage area with the moveable blackboard drawn down. This chalkboard thus serves two purposes—to enclose the tools and keep them free from dirt and dust and to make an instructional area. The blackboard can easily be moved up and down as it is needed. With space at a premium in most shops, the space-saving feature of this idea is important.

A bulletin board and a project shelf are located above the tool panel. ★



It isn't over the teacher's head

Electronics Can Be Taught in the General Shop

By William H. Mason

Department of General Engineering,
Purdue University, Lafayette, Indiana

IN many small high schools offering a general shop program, the field of electronics is not covered, although many of the general objectives of industrial arts can be achieved through it. The fundamental reasons for this exclusion are probably because: (1) the tools and equipment are thought to be expensive, (2) the subject-matter presentation is not thought to be of interest to the student, and (3) last but probably the most influencing factor, the teachers in small general shops feel, since they have not had formal training in electronics, that they would be attempting to offer an area which would be over their heads, so to speak.

Let's see if such a viewpoint is valid.

Tools, Materials, and Equipment

The tools, materials, and equipment required to establish an electronics area are relatively inexpensive as compared to some of the other areas such as machine shop, woodworking, plastics, and metalwork. Many of the hand tools such as pliers, screwdrivers, diagonal cutters, and soldering irons are common to the majority of shops, and may be further utilized in an electronics area. Such equipment as chassis, knives used to strip wire, and phono test units may be constructed in the shop from available materials at practically no expense.

Many parts and components such as tube sockets, resistors, capacitors, tubes, various types of switches, and hook-up wire may be obtained from war-surplus equipment and discarded radios. Many radio service shops will donate old radios beyond repair but still containing many usable parts. It may be necessary to purchase some materials and components, but these can be bought wholesale, and in most cases, the cost will be relatively low. It is therefore possible to organize, institute, and teach a small electronics area with a minimum outlay of money.

Student Interest

The idea that an area in electronics is too advanced and not of interest to the students is without basis. Such an area can be one of the most popular and appealing units in a general shop, if organized and presented in a suitable manner. Even in this modern era where radio, radar, and television are commonplace terms, an element of mystery still surrounds these electronic devices for the average student. It is this very element of mystery that makes electronics appeal to students.

If theory is held to a minimum in the presentation of the laboratory work and active shop work emphasized, the problem of maintaining interest can be solved. The techniques employed by the instructor in presenting the area are of utmost importance. The teacher must create interest in the students when introducing the area.

An example of this is the wiring of a simple phono-oscillator circuit. In introducing the laboratory work, the teacher should point out that the unit to be wired is in reality a miniature transmitting station in which sound is converted into electrical impulses which are then broadcast. These electrical impulses can be picked up by a radio and converted back into audible sounds. An oscillator should then be shown, followed by a demonstration of its operation. Immediately the students' interest is aroused and they are eager to begin construction of such a transmitter. In most cases the interest remains high until the unit is completed and tested for successful operation. In wiring such an electrical unit, the students have used many tools and materials, and have become familiar with a few of the basic electronic components.

Any area of instruction can be dull and boring if not presented in an attractive manner by an enthusiastic teacher. The real interest of students is aroused only when confronted with subject matter organized and taught in a dynamic and energetic way.

Inexperience Is No Excuse

Although electronics is taught in the shop curriculum of many teacher-training institutions, an investigation of available records reveals this number to be in the minority. Many teachers harbor the idea that since they have not had formal training in electronics, this phase of our modern, industrial world is too advanced and difficult for them to teach.

One does not have to be an electrical expert or have had formal training in this field to organize an elementary unit in electronics. It may be assumed that in undergraduate work most teachers have laid a basis for teaching such an area by completing such courses as physics, mathematics, and electricity. With this foundation, a teacher can read and study a few of the many excellent books, magazines, and pamphlets now available from publishers and manufacturers of electronic parts. It is not necessary to possess knowledge of all the details and theory relative to the operation of radios, radar, and television, although a teacher should have a basic understanding of the general principles of operation. The effectiveness of good instruction depends on the interest, initiative, foresight, and selfpreparation of the teacher.

This is how an inexperienced teacher, who is a friend of the author, organized, instituted, and is now administering a successful electronics area in a general shop. This teacher taught a well-organized general shop including units in plastics, printing, bench metal, drawing, and sheetmetal. Having an ardent interest in his students and work, he believed that an area in electronics would round out and give him a better balanced shop program. Realizing his lack of training and experience in this field, he nevertheless attacked with determination the problems of preparing himself, the subject content, the teaching materials, and the physical equipment.

The first time and even the second time the unit was offered, the planned laboratory work did not proceed as anticipated. But only minor difficulties were encountered and these were eliminated before the unit was presented again. By improving various phases of the laboratory work, this teacher has organized a unit that in a year has become one of the most popular activities

ever to be offered in his shop program.

Suggested Procedure

The following sequence of steps is offered as a suggested procedure in the organization and preparation of such an area in elementary electronics:

1. Compile printed materials (data sheets, pamphlets, catalogs) from manufacturers of electronic equipment.
2. Seek advice from experienced teachers and radio servicemen.
3. Read and study material pertinent to subject content and related information.
4. Develop an outline for the area of instruction.
5. Develop instruction and job sheets for related information and laboratory work.
6. Assemble necessary tools, equipment, and materials.
7. Set up work stations, tools, and equipment layout.
8. Develop and build teaching aids.
9. Assemble and wire for practice a model of each unit to be used in the laboratory work.

Course of Study

The following suggested course of study for a two-week unit in electronics is an attempt to present in a simplified form, an outline which may be used as a basis for establishing such an area in a general shop. The outline does not include elaborate details, but is merely to serve as a guide for those desiring to start an area in this field. The size of the class, the tools, the equipment, and the laboratory work are only suggestions and may be varied to meet the needs and requirements of individual programs.

Name of Unit:

Introductory Electronics

Objectives:

1. To learn about some of the materials and processes of the electronics industry.
2. To learn the proper use of some of the tools used in electronic work.
3. To become familiar with a few of the basic components of electronic circuits.
4. To learn radio symbols and nomenclature.
5. To learn how to read a simple schematic diagram.
6. To learn about solder and fluxes.
7. To learn how to tin a soldering iron.
8. To learn how to make a good solder connection.
9. To develop a degree of skill in wiring simple circuits.
10. To learn how to use electronic testing equipment.

Grade:

The area of instruction is organized for beginning students as a part of a general-shop curriculum. It may be offered with modications in any grade from 9 through 12.

Students can gain much from a unit on electronics in a general shop in the way of skills, appreciations, and development of interest in an important and growing industrial activity.

Time Available:

The area covers a period of one hour per day for ten days or a total of ten hours. By expanding the subject content and the laboratory work, the instruction may be increased to any desired length.

Division of Time:

Conference period	1 hour
Demonstration period	1 hour
Laboratory period	7 hours
Review and test period	1 hour

Size of Class:

Because of the nature of the work and so that the teacher may exercise close supervision, the size of the class is limited to a maximum of ten students. For the purpose of this outline, it will be assumed that there are ten students in the area.

Tools and Equipment:

The electronics area consists of ten work stations each provided with the following tools:

1 Needle-nose pliers (bent or straight) 6″
1 Diagonal cutter—6″
1 Screwdriver (small size)
1 Screwdriver (medium size)
1 Soldering iron (small tip)
1 Knife
1 Resistor identification chart
1 Tube tester
1 Electrical outlet (110-v a-c)

The other general equipment may be kept in the tool room and checked out when needed: ohmmeter, phono-pickup test unit, radio, and voltmeter (optional).

Methods of Instruction:

Due to the variation of the subject content of the area, it is necessary to utilize several different teaching methods. The final selection is left to the instructor so that he may apply them to fit his individual needs. Suggested methods and aids in teaching the laboratory work are:

Conference Periods
Group Discussions
Individual Instruction
Demonstrations
Teaching Aids:
- Photographs
- Charts
- Assignment sheets
- Information sheets
- Operation sheets
- Job sheets
- Drawings
- Samples and models

Organization of the Laboratory Work:

The problem of what shall be the content of the laboratory work is one with which the teacher will ultimately be confronted. Listed below are a number of circuits which may be of help in guiding the teacher in developing this phase of the area. These circuits with various modifications may be found in books, magazines, and tube manuals, and will fulfill successfully the purposes of the laboratory work.

One tube phone-oscillator
One tube phono-amplifier
Photo-electric cell
Crystal set radio

It is probable that only one of these circuits can be wired and tested in the time allotted in this outline.

The laboratory work may be organized on a project basis for those students desiring to keep the completed unit, or on an exercise basis for those students who do not wish to keep the units. Kits may be assembled and issued to students for wiring as a laboratory exercise. These kits consist of a chassis on

which are mounted all the components of the circuit except resistors, capacitors, and hook-up wire. The students check out these kits from the stockroom for wiring during the laboratory period. After wiring and testing, the chassis is stripped, cleaned, and returned to the stockroom for future use. For students who desire to keep the completed unit, a number of kits may be stocked as supplies and issued on a regular bill of materials.

Outline of Laboratory Activities:

The following breakdown of the laboratory work is based on ten hours available time.

Period 1

A. Introductory conference
   1. Presentation of material to be covered
   2. Policies and procedures to be observed
   3. Attainment standards
   4. Safety in the area

B. Introduction to the tools and equipment

C. Radio symbols and nomenclature

Period 2

A. Radio symbols and nomenclature

B. Reading and interpreting simple schematic diagrams

C. Use of schematic diagrams when wiring a circuit

Period 3

A. Review of schematic diagrams

B. Introduction to basic electronic components
   1. Resistors
      (*a*) Common types
      (*b*) Identification
         (1) Radial-lead type
         (2) Axial-lead type
      (*c*) Tolerance rating
      (*d*) Connected in series
      (*e*) Connected in parallel
   2. Capacitors
      (*a*) Common types
      (*b*) Identification
         (1) Mica-type color code
         (2) Other methods
      (*c*) Tolerance rating
      (*d*) DC test voltage rating
      (*e*) Connected in series
      (*f*) Connected in parallel

Period 4

A. Basic electronic components continued
   1. Electronic tubes
      (*a*) Basic types
      (*b*) Parts and functions
   2. Switches
      (*a*) Common types
      (*b*) Uses and operations
   3. Coils
      (*a*) Various types and their uses
   4. Tube sockets
      (*a*) Types
      (*b*) Pin designation

Period 5

A. Types of solder and flux

B. Demonstrations
   1. Tinning a soldering iron (care and maintenance)
   2. Techniques in making a good solder connection
   3. Techniques in wiring electronic circuits
      (*a*) Keep wires as short as convenient
      (*b*) Avoid duplicating circuits
      (*c*) Keep all wires close to the chassis (particularly plate leads)
      (d) Plan wiring procedure so as to cross as few wires as possible
      (e) Use correct soldering techniques

C. Laboratory work
   1. Tin soldering iron
   2. Check out, inventory, and start work on selected circuit

Period 6

A. Continue laboratory work

Period 7

A. Continue laboratory work

Period 8

A. Continue laboratory work

Period 9

A. Demonstration
   1. Checking vacuum tubes
   2. Connecting up and testing model unit

B. Continue laboratory work

Period 10

A. Testing units for operation

B. Stripping down and cleaning chassis

C. Cleaning up area and checking tools

D. Short oral quiz over unit

Bibliography:

The references listed below have been examined and found to be especially helpful to an individual starting a unit in electronics. The list is by no means complete as there are numerous excellent books on electronics and related fields.

A Dictionary of Radio Terms. Chicago, Illinois: Allied Radio Corporation, 1946.

Applied Practical Radio. Chicago, Illinois: Coyne Electrical School, 1947, Volumes I, II, III, IV, V.

Allied Radio Catalog. Chicago, Illinois: Allied Radio Corporation, 1953.

Burns, Elmer E. *Radio: A Study of First Principles.* New York: D. Van Nostrand Company, 1938.

Duncan, R. L. *Foundations of Radio.* New York: John Wiley and Son, Inc., 1931.

Ghirardi, Alfred A. *Radio Physics Course.* New York: Radio and Technical Publishing Company, 1937.

Ghirardi, Alfred A. *Radio Troubleshooter's Handbook.* New York: Murray Hill Books, Inc., 1943.

Henry, Keith. *Principles of Radio.* New York: John Wiley and Son, Inc., 1938.

Hicks, H. S. *Principles and Practice of Radio Servicing.* New York: McGraw-Hill Book Company, 1943.

How Electronic Tubes Work. Schenectady, New York: General Electric Company, 1944.

Meissner Instruction Manual. Mt. Carmel, Illinois: Meissner Manufacturing Corporation, 1943.

Radio Builders Handbook. Chicago, Illinois: Allied Radio Corporation, 1948.

R.C.A. Receiving Tube Manual. Camden, New Jersey: Tube Department, R.C.A., 1952.

Swoope, C. W. *Lessons in Practical Electricity.* New York: D. Van Nostrand Company, 1926 (17th ed.).

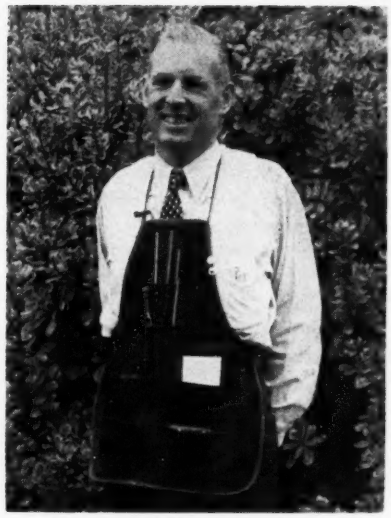
Technical Manual: Sylvania Radio Tubes. Emporium, Pa.: Sylvania Electric Products Inc., 6th ed., 1946.

The ABC's of Radio. Schenectady, New York: General Electric Company, 1945.

Williams, H. L. *The Fundamentals of Radio and How They are Applied.* Philadelphia, Pa.: The P. Blakiston Co., 1945. ★

AVA Convention Report

See page 18 for a complete story on the 47th Annual Convention of the AVA held in Chicago last month.



A Handy Apron for Drafting Teachers

By Kenneth Maxwell

Chico High School, Chico, California

THE handy little suede apron pictured above is a time-saver and a clothes-saver for the drafting teacher.

The saving from an instructional standpoint occurs when the teacher stops at a student's desk to help him. Frequently-used instruments are carried in the pockets. The upper pockets hold the several pencils always needed. The lower pockets contain such items as a triangle, lettering instrument, erasing shield, eraser, extra compass leads, a small screwdriver, notebook, a scratch pad, pass-key, keys to cupboard, etc. Although each student has his own instruments, it is quicker for the teacher to pull one out of his pocket for a demonstration than to wait for the student to find his and hand it to the teacher. The proper pencils, carefully sharpened, are instantaneously available without any fumbling through pockets.

The saving on clothing is not to be minimized either. Pencils in the vest pocket not only wear the pocket itself but also wear the lining of the coat where it rubs the pencils. Constant reaching into coat or pants pockets for keys soon wears them, too. All this wear is saved by using this apron which may be either purchased or made. ★

How to carve a

Ladies' Leather Purse

By James H. Bailey

Department of Industrial Arts,
Central Michigan College of Education, Mount Pleasant

LEATHERCRAFT offers real opportunities in the industrial-arts program for developing an interesting hobby skill as well as developing tool skills and a knowledge of an industry and a material that play an important part in the everyday lives of all of us.

Following is an instruction sheet which we have used successfully in teaching a unit in leathercraft. It is designed for first-year college students but can be readily adapted for lower grade levels.

How to Carve a Ladies' Leather Purse

1. Select and trace the design, using tracing paper and soft lead pencil.

2. Cut leather to desired dimensions with a sharp knife and a metal straight edge. Use at least six-ounce cowhide.

3. Wet the leather. The thicker the leather, the more water will be required. When the surface of the leather has returned to its natural color, it is ready for working. With heavier leathers this may take several hours.

4. Place design in correct position on leather and hold in place with Scotch tape so it cannot creep or move while being traced.

5. Trace the design, using tracer or modeling tool.

6. Remove the design.

7. Cut border lines and lines of design with the swivel-knife to a depth of about half the thickness of the leather. Keep the swivel-knife as sharp as possible as this operation determines to a great extent the final quality of the completed purse.

8. Bevel around the inside of the border lines, the outline of the design, and other lines as necessary, using the beveling tool and mallet. Finer lines may be tooled instead of carved.

9. With background stamp and mallet, pound down the background of the design, letting each individual pattern of the stamp touch, but not overlap, the previous one.

10. Use a pear shader, or other type shader, to shade depressions in leaves, petals, and flowers. If the marks made by this tool are not darker than the original color of the leather, then the leather is not yet at the correct stage for shading, being either too wet or too dry. Allow to dry further or apply more water, as experience will determine.

11. Complete the surface decoration of the design, using stamps as available and to suit individual taste.

12. Turn leather over and, being careful not to mar the carved side, cut v-grooves into the flesh side wherever the leather is to be folded. Cut not more than half-way through, being very careful, as a slip of the knife at this point may cause complete loss of the piece of leather.

13. Lightly lay out thonging chisel lines 3/16" from all edges to be laced, using a tracer or modeling tool and a straight edge.

14. Fold into desired shape and allow to dry.

15. Skive all edges to be laced, using a skiving knife or one of the patented skiving tools requiring a razor blade.

16. Punch holes or cut slits for bag clasp. The clasp may either be attached now or after the lining is cemented in, depending on the type of clasp.

17. Cut out the lining for the purse, using a thin leather such as a skiver lining, allowing about an inch of extra materal on all sides.

18. Cut and sew pockets to lining as desired.

19. Apply a coat of rubber cement to the lining and to the outside piece. Place the two pieces together, keeping the purse in its finished shape. Press the two pieces together by hand, smoothing out all wrinkles. Trim off excess lining with a razor blade.

20. Cut out the gussets or end pieces for the purse. Apply a coat of rubber cement to the flesh side, and fold each guesset in half along its shorter axis. Press together firmly, then fold into the shape it will assume when fastened in the purse.

21. Punch holes in gussets for strap hangers and attach.

22. Cement gussets in place, applying rubber cement to both surfaces where the gusset fits into the purse.

23. Lace the edges of the purse. A lacing of the same color as, or slightly darker than, the leather will usually look better than a lacing lighter in color. The type of stitch used in lacing the edge may vary, but the double-loop stitch is one of the most popular and may be found in most leatherworking books. Use a fid or any sharp-pointed object to open the holes, opening each hole immediately prior to lacing. Sharpen the point of the lacing and dip in Duco cement to stiffen. Use a length of lacing which can be handled easily—about 4' or 5' in length—and splice when necessary.

25. After completing the lacing, dampen it and pound lightly to smooth it and make it lie close to the leather.

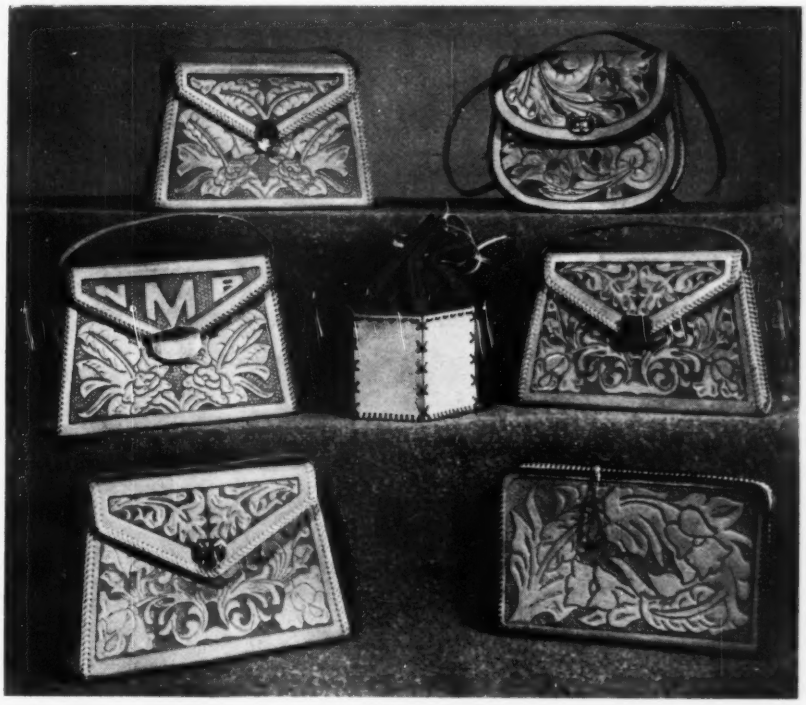
27. Cut shoulder strap ¾" wide and 40" long out of six-ounce cowhide or heavier. Round the edges of the strap with an edge beveler. A border may be applied along the edge of the strap by using a single-edge creaser.

28. Attach strap fastener in each end of strap for fastening strap to bag; or punch holes in each end of strap, thread through strap holders in each gusset, and fasten end of strap back against itself with rapid rivets.

29. If the leather has become soiled from handling, bleach with a weak solution of oxalic acid. Apply with a cloth and allow to dry.

30. Apply two coats of Neat-Lac for a protective coating. ★

These purses were made by first-year college students, most of whom had had no previous experience in leatherworking. Units on leatherworking enrich the industrial-arts offerings.



School Shop KINKS

Payment will be made for each Kink published. Send to Editor, School Shop, Ann Arbor, Mich.

Sawing Tips

Here are a couple sawing tips that I have found useful:

A strip of number 1/0 or 1/00 sandpaper glued to the miter gauge of the bench saw will prevent stock from slipping while being cut off or mitered.

Also a strip of wood screwed to the miter gauge, reaching across the saw, will prevent lumber from chipping at the end of a cross cut. This is especially valuable when using dado saws.—*C. E. Conley, Cammack Junior High School, Huntington, W. Va.*

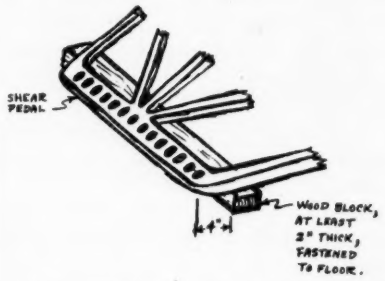
For Trimming Models

Either brass or aluminum eyelets of various sizes make excellent trim for port and anchor holes in plane and ship models and help to make the models more attractive.

Mount these eyelets in the model by drilling the appropriate sized hole in the project. Apply a small amount of airplane cement to the back of each eyelet and press it into the hole. The eyelet will then remain fast.—*William O. Bruehl, Lynn, Massachusetts.*

Another Safety Stop

The safety stop for squaring shear pedals described in a recent "School Shop Kinks" (Nov. 1953) will still permit the pedal to strike the operator's shin, ankle, or instep if he stands too close. The idea shown in the drawing below is safer in my opinion.

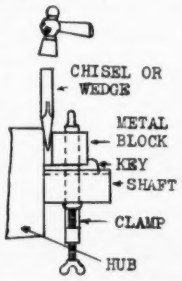


A woodblock at least 2" thick is fastened to the floor about 4" from the end of the foot pedal. This will stop the toe of the operator's foot so that the pedal cannot strike the ankle or instep as well as protecting against smashed toes.

This "kink" was passed on to me at least five years ago and I have been using it ever since.—*John C. Klier, Clifton Park Junior-High School, Baltimore, Md.*

How to Pull a Tight Key

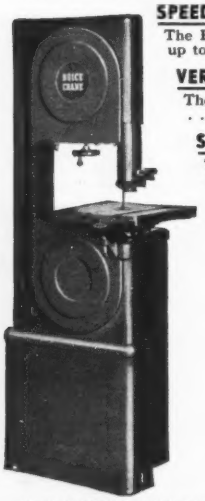
Here is a simple kink that the writer has found useful for pulling tight keys. The drawing makes the operation practically self-evident. The metal block is shown thicker than necessary in order to illustrate the method more clearly. In fact it is better to use a thinner block than shown in order to lessen the overturning movement. Of course the exact arrangement as sketched need not always be strictly followed, there being a hundred and one variations of problems and as many solutions, all of which may be based on the same principle as illustrated here. The main idea is to use a metal block, the width of which is sufficient to leave a gap into which a chisel is driven for loosening the key. Sometimes a metal wedge such as used for splitting logs comes in handy for this same purpose, as the reader can readily visualize without the necessity of any further explanation.—*W. F. Schaphorst, Newark, N.J.* ★



Consider What You Want IN A BAND SAW

Before you buy, check all these points. The BOICE-CRANE 14" BAND SAW

was designed to best fill the needs of the AVERAGE SHOP. Are you average? Do you want



SPEED?
The Boice-Crane saws 2 to 4 times freer, faster and smoother! Blade speed up to 4,100 f.p.m. at 1,200 r.p.m.

VERSATILITY?
The Boice-Crane cuts, sands, grinds (some models even file) any material . . . accurately . . . smoothly.

SAFETY?
The wheels and blade of the Boice-Crane are entirely enclosed, except at the cutting point. The blade guides can be safely adjusted by single control, even when running.

CAPACITY?
The Boice-Crane gives you 13½ inches from the blade to the guard, permitting 27-in. diameter work. From guide to work table: 7¾". Blade widths: 3/16", ¼", ⅜", ½" and ¾". Blade length: 98".

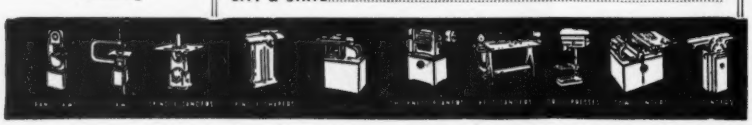
STURDINESS?
The Boice-Crane has a strong, one-piece welded steel frame. The wheels are strong but light, specially engineered for top cutting performance, with a diameter of 14 inches and a face of one inch. The grease-sealed ball bearings assure long service.

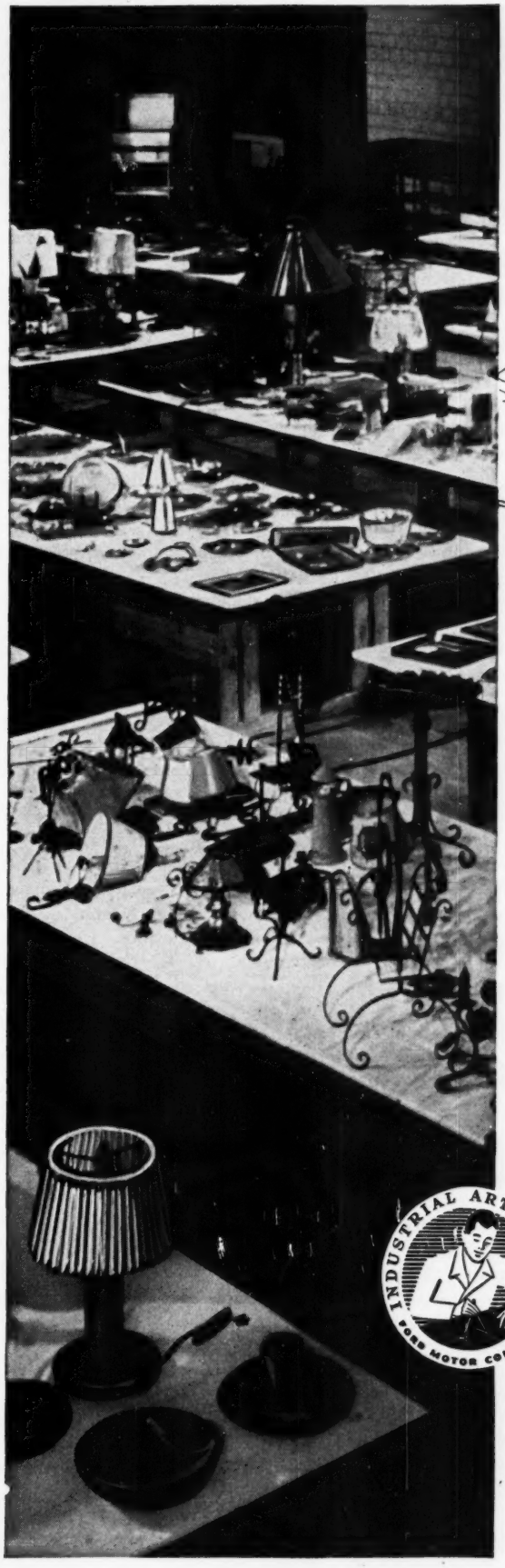
COMPACTNESS?
The over-all height of the floor model is 67 inches. The motor is in a sealed-off compartment in the cabinet base. The 15" x 15½" table tilts on 45° R., 10° L. double trunnions.

MAIL COUPON NOW FOR DETAILS AND PRICES. 12 Models—Single and 8-Speed Backgeared.

FREE!
Big New Catalog on Boice-Crane Woodworking Power Tools for Cutting—Shaping—Drilling—Finishing.

BOICE-CRANE COMPANY
938 Central Avenue Toledo 6, Ohio
( ) Please send free literature on Boice-Crane Band Saw.
( ) New 52-page Catalog No. 53 on entire line.
NAME .....
FIRM .....
STREET .....
CITY & STATE .....





Over 25,000 projects have been judged by I.A.A.

. . . and everyone a credit to your profession!

INDUSTRIAL ARTS AWARDS PROGRAM CONTINUES TO RECOGNIZE QUALITY CRAFTSMANSHIP

The I.A.A. is the largest competition of its kind giving recognition to teachers whose students build prize-winning projects. The success of the I.A.A. is possible mainly because of you—and, Ford Motor Company is delighted to honor you along with your students.

Teachers whose students win Outstanding Achievement Awards in 1954 will be 3-day guests of Ford Motor Company in Detroit. They will visit River Rouge, Henry Ford Museum, Greenfield Village and other points of interest. The Awards dinner completes the trip.

How you can enter your students in the 1954 competition

If you do not already have complete information, please fill out and mail this coupon for a free I.A.A. rules booklet and entry blank.

INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY, 3000 Schaefer Rd. Dearborn, Mich.

Name _____

Address _____

City _____ *Zone* ____ *State* _____

D

GREAT NEW CATALOG!

NOW READY FOR TEACHERS OF

INTERNAL CARVING OF PLASTICS

BRINGS YOU AMERICA'S LARGEST SELECTION OF CARVING SUPPLIES FOR USE IN THE SCHOOL SHOP

Send for FREE copy today! It contains hundreds of items—fully illustrated. Gives school discounts on everything you need for shop projects in plastic carving:

• PLASTIC SHAPES & ACCESSORIES
• FINDINGS • SHEETS • TUBING
• RODS • SALVAGE MATERIAL
• MANUALS • DRILLS • TOOLS
• READY-TO-CARVE GIFT ITEMS

FREE INTERNAL CARVING INSTRUCTION SHEETS
for Distribution to Students

Describes basic techniques in carving, dyeing, and filling. Simply make request on your school letterhead, stating quantity required, and they will be mailed without charge.

D. W. COPE PLASTICS, Dept. I
9833 HIGHWAY 99
ST. LOUIS 21, MO.

Over 85% of the torque wrenches used in industry are
STURTEVANT
TORQUE WRENCHES
Read by Sight, Sound or Feel.
• Permanently Accurate
• Practically Indestructible
• Faster—Easier to use
• Automatic Release
• All Capacities
in inch ounces . . . inch pounds . . . foot pounds
(All Sizes from 0-6000 ft. lbs.)
STURTEVANT TORQUE MANUAL
Every manufacturer, design and production man should have this valuable data. Sent upon request.
STURTEVANT CO

AVA Attracts Thousands to Chicago Convention

Plans disclosed for expanded public-relations program

M. D. Mobley, AVA executive secretary, receives award from The Ship for outstanding contribution to field.

VOCATIONAL educators in substantial numbers attended the 47th annual convention of the American Vocational Association in Chicago, Ill., November 22-27 at the Conrad Hilton Hotel. Over 3000 people registered for the meetings, a figure which was disappointing to convention officials, however, who had hoped it would go to 5000, but apparently the Thanksgiving holiday had an effect on attendance.

The new president of the AVA is Mark Nichols, state director of vocational education for Utah. Vice-president for industrial arts is Shriver L. Coover, head of the department of industrial arts at the California, Pa., State Teachers College. Cecil Stanley, Nebraska, is vice-president for distributive education; Louise Keller of Iowa, vice-president for home economics; R. E. Anderson of South Carolina, vice-president for agriculture; and Charles W. Sylvester of Baltimore was reelected treasurer for his 27th term.

Recipient of The Ship's award for outstanding contribution to vocational education was M. D. Mobley, executive secretary of the AVA. The Ship, organization of representatives of firms in the field of vocational education, held its party on Friday morning with entertainment and awarding of prizes to an overflow crowd.

The convention went on record in opposition to any changes in the Smith-Hughes Act to lower standards or make it an authorization-of-funds act, rather than an appropriations act which would mean that the appropriation would be subject to review by Congress each fiscal year. Action was taken urging all AVA members to keep Congressmen informed about vocational education and the need for continued federal support of the program.

Once again the AVA requested Congress to make the full appropriation under the George-Barden Act and to restore funds for distributive education.

Each state association will be asked to give the AVA $1 per member as an emergency grant to be used for a greatly expanded public-relations program on a national basis.

The association is also planning to investigate various plans covering accident, health, and liability insurance for the benefit of its members.

New officers of the National Association of State Supervisors of Trade and Industrial Education, elected at the convention, are as follows: president, Herman Miller, Washington, D.C.; vice-president, W. R. Cate, Texas; secretary-treasurer, O. H. Beaty, Kansas.

The AVA awards for outstanding contribution to vocational education were given to Homer J. Smith, professor of industrial education, University of Minnesota; A. K. Getman, formerly state director of vocational education for New York; C. M. Miller, state director of vocational education for Kansas; and Edna Amidon, chief of the home economics service, U.S. Office of Education.

New chairman of the Trade and Industrial Education Policy and Planning Committee is Arthur B. Wrigley, state supervisor of T&I, for New Jersey.

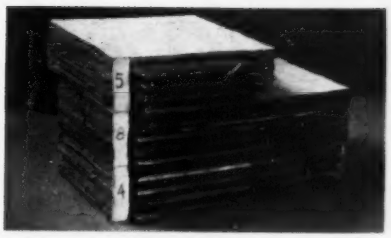
The National Association of Industrial Teacher-Trainers elected as president A. P. Twogood of Iowa State College and, as vice-president, Melvin L. Barlow, supervisor of trade and industrial teacher-training, University of California, Los Angeles.

Announcement was made at the Chicago meeting that the 1954 convention will be held December 3-7 at San Francisco, California. The 1955 meeting will be held at Atlantic City, New Jersey, November 28-December 1 and the 1956 convention at St. Louis, Missouri, December 3-7. ★

Storage of Color Plates for Patent Bases

By Irving J. Sanders

Instructor in Printing,
Metropolitan Vocational High School, New York City



A simple plate rack made out of binders' board.

IN a school print shop, mounted halftones, electros, and line cuts can easily be stored in cases specially designed for that purpose to prevent them from being scratched and mutilated. These cuts are easily accessible by pulling out the drawer and choosing the desired cut.

In shops where advanced presswork is taught, however, there is a need for four-color process and one-color plates that are to be mounted on patent bases. The problem of feasible storage and accessibility of these plates is a very important one.

When color plates are kept together with a cardboard between each plate (as they are normally stored), the entire set of plates must be removed from the shelf in order to get the color plate needed. Sometimes a few sets of plates have to be removed to get to the set wanted. The plate rack shown here eliminates this.

The photograph above shows how a simple rack can be made out of binders' board. The racks can be placed on a shelf, one set of plates on top of another and still the student will be able to remove any *one* plate without handling or disturbing the other plates in the set as well as the other sets of plates.

The binders' board for the rack should be 11 points thick so that it will not sag. The strips on each end and back should be ½" wide and of the same thickness as the shelves plus an added strip of board 6 points in thickness. These two strips of 11 and 6 points will be thick enough to allow sufficient clearance when removing a plate, which is 11 points in thickness.

Plywood ¼" thick may be substituted for the two strips of board between each shelf. The shelves, though, should be of binders' board which is of soft composition. Plywood is apt to be rough and the face of the plate would be scratched if it should accidentally come in contact with the wood when being removed.

The depth of the rack should be made small enough to allow the plate to protrude about ¾" in the front. This will enable one to grip the plate with ease.

The pieces can all be put together with binders' flexible glue or liquid-hide glue. As an added precaution, a few nails can be used on both sides.

The racks may be numbered on the side as indicated in the photo, with an index posted near the racks for ease in locating the plates. ★

SHELDON
CHICAGO U. S. A.

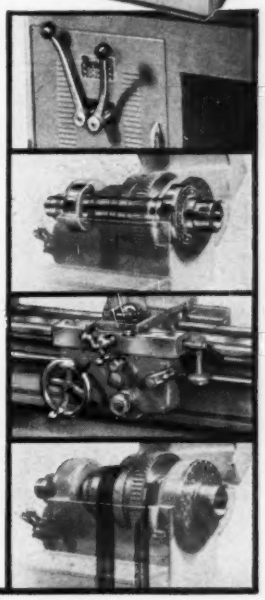
Important ★
above all else in school lathes

★ **SHELDON SAFETY**
. . . all belts, pulleys, countershafts, gears and motors are completely enclosed. Speed changes and gear-ratio changes are made by external shift levers.

★ **SHELDON PRECISION**
. . . "Zero-Precision" Tapered Roller Spindle Bearings permit student work to ten-thousandths of an inch, and hold this accuracy without constant maintenance.

★ **SHELDON CONTROLS**
SHELDON-taught students are ready to operate standard industrial lathes—are familiar with standard controls and the "big lathe feel".

★ **SHELDON CAPACITY**
The extra swing and greater collet capacity increase the range of possible student projects—from the "playing store" group to the practical. The extra power to the spindle, the speed range, weight and strength of SHELDON Precision Lathes permit heavy cuts, spinning and demonstration of correct use of new cast-alloy and carbide-tipped cutters.



Built by modern methods, with the finest machine-tool special machinery, on a continuous production line basis, these better lathes cost little more than ordinary school type lathes. *Write for Catalog*

SHELDON MACHINE CO., INC.
4260 North Knox Ave., Chicago 41, Illinois

Strictly Personal

ABOUT YOUR FELLOW TEACHERS

JAMES R. COXEN, assistant director of vocational education, U.S. Department of Health, Education and Welfare, retired October 1. Mr. Coxen had served the U.S. Office continuously for the past 24 years.

Also retired from the U.S. Office of Education is IVA G. PRISK who has been educational statistician for the vocational education division since a year after its establishment in 1917.

ROBERT T. STONER, former chief, trade and industrial education, Pennsylvania State Department of Public Instruction, is the new director, bureau of adult, vocational, and practical-arts education in the Pennsylvania State Department. He succeeds PAUL L. CRESSMAN, recently retired.

At a recent meeting of the Missouri Vocational Association executive committee, DAVID BERRYMAN, supervisor of industrial education, Poplar Bluff, Mo., was elected to head the MVA for the coming year.

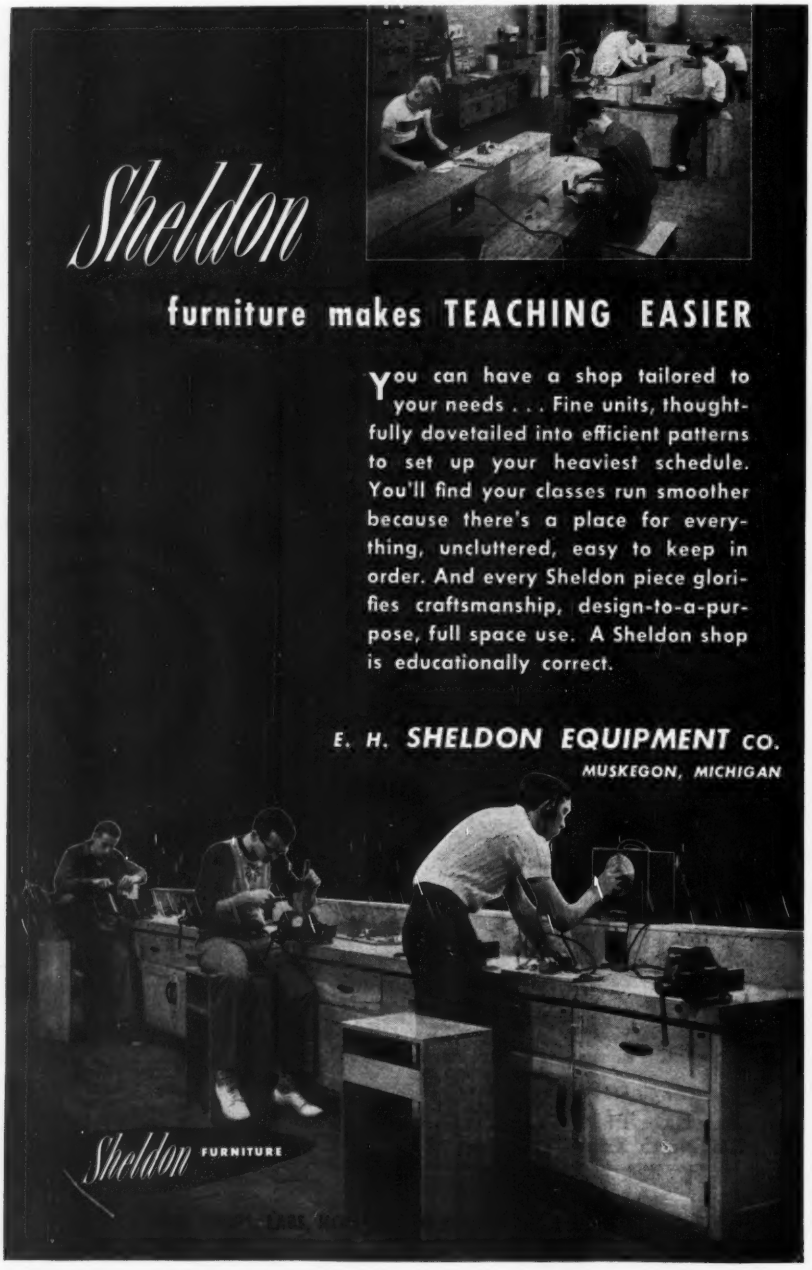
D. ARTHUR BRICKER, director of industrial arts, Cincinnati, Ohio, Public Schools, has resigned as executive-secretary of the American Industrial Arts Association, a job he has held for the past six years. KENNETH W. BROWN, director of industrial arts, New York State College for Teachers, Buffalo, has been named to the executive-secretaryship.

W. K. DUNTON is now supervisor of trade and industrial education, Warren, Ohio, Public Schools. He formerly served in the same capacity in Piqua, Ohio.

CLARENCE A. NEEDLER has been appointed by the Studebaker Corp., South Bend, Ind., to head its apprenticeship program, which he helped to develop. Mr. Needler, former industrial coordinator, South Bend Public Schools, succeeds E. WARRICK, retired.

CHARLES M. MILLER, director of the Kansas State Board for Vocational Education since its organization in 1922, will retire January 15 shortly after he reaches his 70th birthday.

PAUL L. CRESSMAN, who recently retired from the staff of the Pennsylvania State Department of Public Instruction, is heading up a mission of vocational-education specialists who are helping to establish a technical-training institute in Baghdad, Iraq. ★


Sheldon
furniture makes TEACHING EASIER
You can have a shop tailored to your needs . . . Fine units, thoughtfully dovetailed into efficient patterns to set up your heaviest schedule. You'll find your classes run smoother because there's a place for everything, uncluttered, easy to keep in order. And every Sheldon piece glorifies craftsmanship, design-to-a-purpose, full space use. A Sheldon shop is educationally correct.
E. H. SHELDON EQUIPMENT CO.
MUSKEGON, MICHIGAN
Sheldon FURNITURE

Here Is a Way . . .

to publicize your industrial-education program

Help from the U. S. Mail

IT is not enough just to take a project home when it is completed, believes Cecil A. Warner, industrial-arts instructor of Central Square, N.Y., Central School.

Recently when members of his ninth-grade classes in comprehensive general shop completed work on a code buzzer project, he allowed them to take the project home. But he did more than that. Independently, he mailed to each parent a letter explaining what the code buzzer is, why the pupil worked on it, and where it fits into the educational pattern for that child.

"This contact with the parent is often neglected," states Mr. Warner. "Little wonder that some teachers say, 'The parent just doesn't care.' How can he care if he does not know for sure what he is supposed to care about?" ★

THERE'S A TYPE FACE FOR EVERYBODY

Garamond ★ *THE COMPETENT TYPE*

No. 11 OF A SERIES . . . Types shown are ATF Garamond, Italic and Bold.

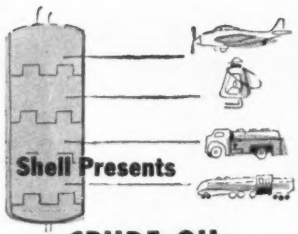
With outlook broad and ceiling unlimited, with head in the clouds and feet on solid earth, this type flies high in the esteem of all America. So competent, so compatible that it deservedly has retained its proud altitude throughout four centuries. Garamond is an everlasting favorite among the 250 fine foundry types by ATF; a face truly worthy of this most proficient of all type casting. It prints sharp and clean on every grade of paper. Is economically used on a non-distribution basis. There's a type face for everybody, and Garamond is for you. Print foundry type!

Branches in Principal Cities

ATF

American Type Founders

200 Elmora Avenue, Elizabeth B, New Jersey



CRUDE OIL DISTILLATION

This fascinating movie strips away the mystery surrounding the basic process for turning crude oil into 1200 different products. It gives a simple, entertaining explanation of petroleum chemistry and the workings of a refinery's giant columns.

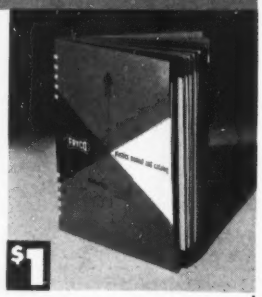
The 16mm sound film runs 13 minutes and is available

Free! from:

Shell Oil Company
50 West 50th Street
New York 20, N. Y.
or
100 Bush Street
San Francisco, Calif.

EVERYTHING IN
PLASTICS
FOR THE SCHOOL

BIG
NEW
FRYCO
PLASTICS
MANUAL
CATALOG



PLASTICS FACTS FOR THE TEACHER

Over 100 pages jam-packed with complete up-to-date plastics facts. The latest data on all types of plastics. Includes such materials as Lucite, Plexiglas, Acetates, Nylon, Polyplastex, Styrofoam, Cements, Dyes, internal carving, Coatings and many, many others. Complete with detailed information on sawing, cementing, casting, dyeing, etc.

PLUS A COMPLETE PLASTICS CATALOG
lowest prices — in any quantity

Hundreds of different plastics materials and supplies... listed complete with unit and quantity prices. Many actual samples included! Over one half million items — the world's largest stock! Plastic sheets, rod, tubing, fibreglas, casting materials, coatings, jewelry findings and many others. In fact, everything you need to teach and work in plastics.

Send $1 today or have us bill you or your school

FRY PLASTICS COMPANY Dept. SS-1
7826 S. Vermont Ave., Los Angeles 44, California

Wide-bottom wooden bases, tailor-made for bottles, reduce spilling losses and help keep liquids clean.

Save the floor with

Bottle Bases for Liquids

By J. James Hasenau

Chadsey High School, Detroit, Michigan

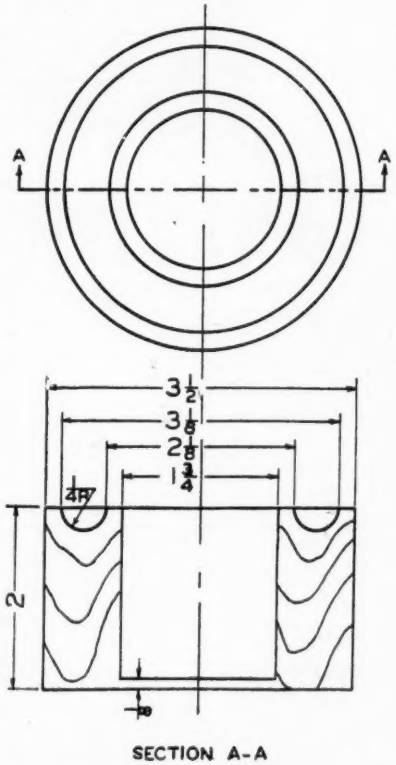
HAVE you ever had sawdust in the shop glue? Has it ever spilled on the floor or bench top? Have you ever had it dry out or become polluted? Other liquids like stain, shellac, grease, oil, and so on, have the same thing happen to them.

The best remedy we have found is a smaller-than-pint container to hold the liquids. Thus, a small jar of glue is not such a loss as a large one might be. The jars we have are held in a wooden block base. The bases are turned up to a standard size and the center hole varied to suit the glass jar. Using the block increases the base area, and helps to prevent tipping of the bottle. A specially designed trough on the top prevents the liquid from running over the sides of the holder. Small glass jars seem to work well, although we have tried brass tubes, too.

The pots work best if they are only half-filled and are equipped with a spreader or brush. With the pots painted different colors and lettered for identification, students find them easy to use. After a couple of weeks of use, the glass liner can be slipped out and soaked in hot water or alcohol, and the liquid content renewed. Or, if the glass won't come out, the base can be split and a new one made.

After using this system for several years, the author finds a great saving in liquids, and a fresher quality of glue, shellac, etc., always available for student use. There are fewer spilling accidents, and when one does occur there is a minor amount of liquid on the floor or bench.

Active storage space is reduced too, for the pots take up a small part of the bench top as compared to a pint or gallon container. Buying may be done on the gallon or five-gallon basis, rather than on expensive pint or half-pint units. ★



SECTION A-A

IN THE *Morning Mail . .*

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

GENTLEMEN: . . . I would like to add my commendation to the others that have come to you regarding the new "Project Design" series. I think this is an excellent idea for raising the level of our design consciousness.

William J. Micheels,
Professor of Industrial Education,
University of Minnesota

GENTLEMEN: Congratulations on the publication of Rupert Evans' article entitled "A Middle Course for Industrial Arts." This is the best example of intelligent, clear thinking in this muddled situation I have seen in a long time.

Homer C. Rose,
Senior Training Specialist,
Bureau of Naval Personnel,
Washington, D. C.

GENTLEMEN: I have read with considerable interest the article, "Some Basic Concepts Concerning Industrial-Arts Education" by Gordon O. Wilber in the December SCHOOL SHOP. It isn't very often that I get excited over what appears in our periodical literature, but this article "gets under my skin." Not because Dr. Wilber wrote it, because I hold him in high regard, and count him among my friends, but because of the philosophy that is expressed. It must be because I am growing old and do not like to see a sound program *diluted.* There does seem to be considerable confusion among our leaders as to what industrial arts really is. They do not seem to be able to accept the indisputable fact that *handwork* is our stock in trade. Remove this core and we have nothing left that cannot be taught by every other teacher in the school. Shopwork has a unique place in our educational scheme. No other subject can offer what we have to offer, and our teachers should be given the opportunity to teach that which they are best prepared to teach. . . .

I cannot accept the premise that our teachers are interested only in good mortise-and-tenon joints or end tables. Good teachers everywhere and always do not confuse the means with the end. What better way can you develop good citizens than to give them an opportunity to do something *well?* This entails good *planning,* good *designing,* good *thinking.* Will not our students learn cooperation and all of the other desirable traits when they are taught some good *skills,* and "on purpose," as I heard Professor Mays say at a convention? Must students "do what they want to do" to feel successful and happy? I wonder how much mathematics or English students would learn under this philosophy. Fundamental skills are absolutely essential, and *must be taught* in a logical and psychological sequence. Industrial arts, to be good general education, cannot be taught haphazardly—or nothing but chaos and confusion will result.

Sure, let us teach boys and girls to be good citizens, but with the mediums and equipment which we have and in which we require the development of at least a certain degree of skill in an organized and planned manner. The results, as far as the students are concerned, will surely be better.

Stanley J. Pawelek,
Supervisor, Industrial Education,
Baltimore, Md., Public Schools

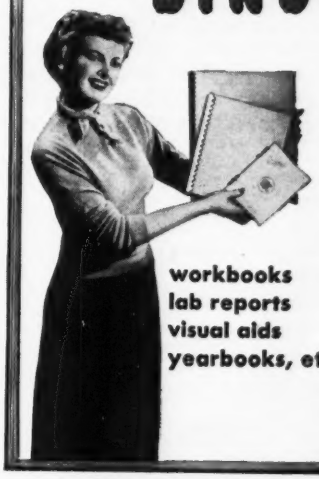
NOW... PLASTIC BIND

WHY use this old fashioned type of binding?

WHEN you can bind this modern way for less!

EVERY PAGE LIES FLAT

In 2 easy steps



workbooks
lab reports
visual aids
yearbooks, etc.

1 PUNCH: Sheets and covers of any size or weight, quickly, accurately.

2 BIND: Open plastic rings mechanically, insert sheets, close rings, remove book.

RIGHT IN YOUR OWN SCHOOL OFFICE... SHOP... CLASSROOM

You can definitely improve the effectiveness of all your typewritten, printed or duplicated material with compact GBC plastic binding equipment. You'll add utility, prestige, color, by binding all sizes of loose pages into easy-to-use booklets in a matter of seconds. Plastic bound pages lie perfectly flat, turn easily, may be quickly loose-leaf inserted or removed.

Highly-efficient GBC machines cost no more than a standard typewriter. Anyone can operate. Teaches new binding methods. Valuable in every school department.

And now you choose from over 30 styles of GBC covers to complete your plastic binding system. Covers available in a rainbow of colors—from low cost paper types to beautiful GBC Vinylite Plastic.

GBC General Binding Corporation

812 W. Belmont, Dept. SS-1, Chicago 14, Ill.

GET THIS FREE PLASTIC-BOUND *Portfolio-Presentation* — TODAY!

This striking, personalized presentation is a unique and beautiful example of modern plastic binding. Packed with illustrated facts and ideas. Gives complete application story, cost advantages in organizations of all types and sizes. Absolutely FREE. Act today!

GENERAL BINDING CORPORATION
Dept. SS-1,
812 W. Belmont, Chicago 14, Ill.

Please send me at once... without obligation... my free plastic bound PORTFOLIO-PRESENTATION that includes prices and applications.

NAME_____

ORGANIZATION_____

ADDRESS_____

CITY_____ ZONE___ STATE____

News

HAPPENINGS IN INDUSTRIAL EDUCATION

Kansas Officers Named

MAX STALCUP of Lawrence, Kansas, High School is president for 1953-54 of the Kansas Vocational Association. The vice-president of the association representing industrial education is Leonard Selig, Augusta High School.

Mr. Selig is also president of the Kansas Industrial Education Association. Vice-presidents of the Kansas IE Association are Floyd Holcomb, Topeka Trade School; Frank Scott, Argentine High School, Kansas City; Jack W. Morgan, Kansas State Teachers College, Pittsburg; George Lodle, Emporia High School; Clarence Youse, Dodge City; and R. R. Reed, Salina.

56th Annual Banquet

THE Massachusetts Industrial Education Society will hold its 56th annual banquet at the Hotel Shelton, Boston, on January 16. The program will feature a panel discussion on "How Can Industrial Arts Meet the Needs of All Secondary-School Youths" by Vinton G. Jones, director of guidance, Braintree school district, Robert G. Andree, principal of Brookline High School, and a third member to be chosen.

Ohio IA Officers Chosen

ELLIS MILLS of Akron, Ohio, was elected president of the Northeastern Ohio Industrial Arts Association at a recent meeting in Barberton, Ohio. Other officers chosen were: Forest Swank of Loudenville, vice-president; William Heasley of Stow, secretary; and Charles Vaughan, Copley, treasurer.

The association will meet February 10 at Kent State University, Ohio, as guests of the Industrial Arts Department and Industrial Arts Club.

Minnesota Assn. Elects

DOUGLAS B. SOWLE, Montevideo, Minn., was elected president of the Minnesota Industrial Arts Association at its convention in Minneapolis in October. Karl Ruthenbeck, Virginia, was named vice-president; Ray Zakariasen, St. Louis Park, was chosen secretary-treasurer; and Ray Doane, St. Paul, was elected convention chairman for 1954.

New Graphic Arts Society

PLANS for the formation of an honorary society for college students in the field of graphic arts are being made under the sponsorship of the International Graphic Arts Education Association. The society will be known as Gamma Epsilon Tau.

Convention Calendar

Southern Section of California Industrial Arts Education Association, Santa Monica, Calif., Technical School, January 23, 1954.

California Industrial Education Association, Fresno, March 12-13.

New Jersey Vocational Arts Association, Asbury Park, March 18-20.

American Industrial Arts Association, Hotel Statler, Los Angeles, Calif., March 23-27.

Indiana Industrial Education Association, French Lick Springs, March 25-27.

Ohio Industrial Arts Association, Neil House, Columbus, March 25-27.

Illinois Vocational Association, Springfield, April 8-10.

Michigan Industrial Education Society, Civic Auditorium, Grand Rapids, April 8-10.

New York State Vocational and Practical Arts Association, Hotel Statler, Buffalo, April 8-10.

Missouri Industrial Education Association Spring Conference, University of Missouri, Columbia, April 16-17.

Connecticut Industrial Arts Association, Teachers College of Connecticut, New Britain, April 23-24.

Pennsylvania Industrial Arts Conference, State Teachers College, California, April 23-24.

Choose Them As Carefully As You Choose Measuring Tools

Starrett

HACKSAWS and BAND SAWS

Starrett Hacksaws and Band Saws are made with the same high quality of materials and workmanship that have made Starrett Tools the choice of skilled craftsmen in every trade. The complete Starrett line includes hacksaws for cutting metals by hand or machine . . . and band saws for cutting metal, wood, plastics, etc. You make no mistake when you specify STARRETT.

FREE REFERENCE MATERIAL

Starrett Hacksaw and Band Saw Catalog and Starrett Cutting Guide give complete information on cutting any material by hacksaw or band saw. Free to instructors. Send for them. Address Dept. SS.

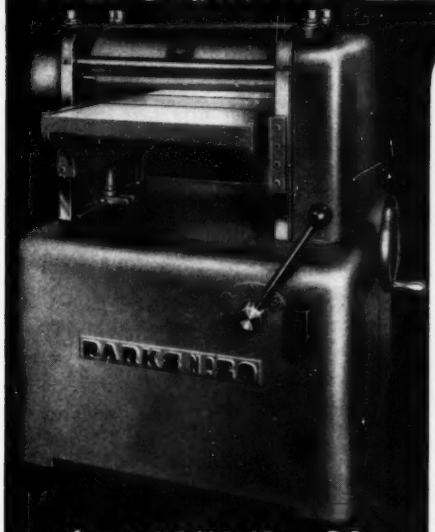
Starrett®

"WORLD'S GREATEST TOOLMAKERS"

MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS • DIAL INDICATORS • STEEL TAPES PRECISION GROUND FLAT STOCK • HACKSAWS, BAND SAWS and BAND KNIVES

THE L. S. STARRETT COMPANY, ATHOL, MASSACHUSETTS, U. S. A.

Your Students Will Learn *FASTER* on a PARKS PLANER



The PARKS No. 20
20" PLANER

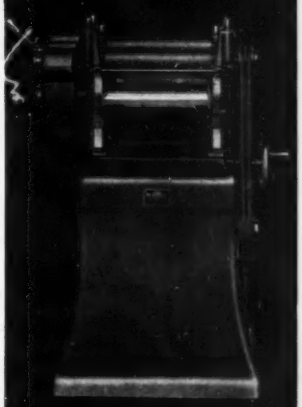
Students advance quickly on Parks Planers because they find them easy to operate, safe, and accurate. And, since both the Parks 12" and Parks 20" Planers have been designed and precision-built for accuracy and high-speed line production in industry, they are ideally suited for the school shop because they give practical experience on the type of machines your students will eventually use. Both machines are priced low enough for even the most modest shop budget.

The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

Write for complete descriptive literature.

Manufacturers of Quality Woodworking Machines since 1887.



The PARKS
Heavy-Duty
12" x 4" PLANER

The PARKS WOODWORKING MACHINE CO., Dept. 22-B13, 1546 Knowlton St., Cincinnati 23, Ohio

---

make one permanent* investment.
. . . forget about replacements.

STACOR 4-POST DRAWING TABLE

DEALER INQUIRIES INVITED

LIFETIME STEEL CONSTRUCTION

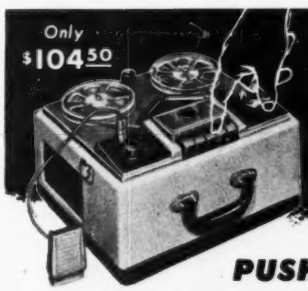
Rigid welded steel construction assures amazing durability under the heaviest use • table top adjusts to comfortable working angle • selected softwood top • hard baked grey hammertone enamel finish • 8 board sizes, 2 heights.

WRITE TODAY FOR CATALOG

STACOR EQUIPMENT COMPANY

Manufacturers of Lifetime Steel Blue Print Filing Cabinets, Drafting Tables, Tracing Tables, Etc.

483 TROY AVE., BROOKLYN 3, NEW YORK



ALLIED'S best buy for schools

PUSH-BUTTON Knight Automatic Tape Recorder

Judged "Best Buy" among recording experts and educators. Features unique Push-Button Keyboard for instant recording with remarkably faithful reproduction. Has 2-speed dual-track recording mechanism and efficient erase system. Records up to 2 hours on a single tape. For instant play-back, just push a button; also has push-button control of forward, reverse and stop functions. Records with excellent fidelity from microphone, radio or phonograph. Plays back through built-in amplifier and high-quality speaker. Simple to operate. Compact, attractive. Complete with microphone, 600-ft. reel of tape and take-up reel. Shpg. wt., 29 lbs.

96 RX 590. KNIGHT Tape Recorder. *Only* **$104.50**

FAMOUS ALLIED BUILDERS' KITS

6-in-1 Radio Lab Kit
Amazingly instructive: builds receiver, broadcaster, oscillator, signal tracer, wave generator, etc. With all parts, tube, instructions.
83 S 770. *Only* . . . **$8.25**

"Ranger" AC-DC Radio Kit
Popular 5 tube superhet radio project kit. Thousands used in shop training. Teaches radio construction. Complete with cabinet.
83 S 275. *Only* . . . **$17.85**

Dozens of other Kits available.

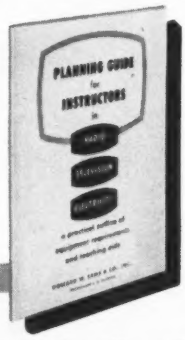
FREE!

268-PAGE 1954 CATALOG

Send for the leading buying guide to everything in electronics for the school: Sound and Recording Apparatus, Training Kits, Lab Instruments, Tools, Books, Electronic Parts, etc. Write for FREE copy today.

ALLIED RADIO
100 N. Western Ave., Dept. 9-A-4
Chicago 80, Ill.

free PLANNING GUIDE
for INSTRUCTORS in
RADIO • TV • ELECTRICITY



a practical outline of equipment requirements and teaching aids

Send for this valuable Guide, prepared by the HOWARD W. SAMS engineering staff in cooperation with the electronics industry and with the help of hundreds of Shop Instructors. Here is the kind of practical, useful information every Instructor in Radio, TV and Electricity will welcome. Includes three valuable sections offering helpful guidance in planning for successful shop instruction:

Test Equipment: Practical data on basic test equipment recommended for school use. Recommendations are based on actual school shop application of the equipment. Illustrates and describes the instruments.

Shop Benches: Illustrates bench designs for practical shop use, developed after extensive study of the problem. Here are ideas that represent the latest in shop planning.

Teaching Aids: Introduces the latest teaching aids for Instructors in Radio, TV and Electricity, including a new Basic Radio Manual outlining a complete course of instruction on the subject. Also included is a listing of manufacturers' aids and literature available to Shop Instructors.

Here is the up-to-date information you want—practical, useful data you can apply toward the planning and organization of a successful shop curriculum.

FREE
SEND FOR THIS
VALUABLE GUIDE

HOWARD W. SAMS & CO., INC.

Howard W. Sams & Co., Inc.
2201 E. 46th St., Indianapolis 5, Ind.
Please send me your FREE Planning Guide for Instructors in Radio, TV and Electricity.

Name.....

School.....

Address.....

City.....State.....

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Come, Let Us Colloque!

WHY, oh why, do educators feel the urge to make the professional game more difficult by changing the signals while the teams are on the field?

The writer is aged and infirm, but he has lived a full life during which he has struggled constantly to keep abreast of the ever-changing jargon through which educators display their inventive genius. As he reflects on the changes he has observed, he is impressed with the futility of trying to understand the terminology in the constant flow of literature appearing in the field of education.

When the student in the school of education emerges from the maze through which he must pass on the way to his bachelor's degree, he is happy in the thought that at long last he has mastered the language through which his professors express their profound philosophies. Unfortunately if he is one of the more ambitious neophytes and has a desire to continue his march toward a Ph.D., he is likely to find that the language he has learned is quite inadequate when he attempts to sound the depths of profundity to which he must descend.

However, he has learned that changes are constantly taking place in life. Day changes to night, the seasons change, and methods of waging war have changed from the era of the prehistoric club to that of the hydrogen bomb. In view of this it may be considered appropriate for the educational researcher to make an effort to keep in step with nature, with military men, and with the physicist.

With this whole question of change in mind it may not be inappropriate to inquire what has happened to that old and popular method of education which, in the less enlightened days of long ago, was known under the title of "A Bull Session."

Within the memory of some of us it was customary for the brethren to discuss the problems of education with enthusiasm as they sat around in their favorite beer emporium. Those were the days of uninhibited speech, so a man could express his feelings freely without fear that his hide would be nailed to the mast by an unsympathetic congressional committee. Those sessions were fruitful in that they provided opportunities for the more vocal members of the group to air their educational theories before an assembly of their peers. The fact that many of those theories were received with derision mattered not at all. The important thing was that they were explored and revealed in all their nakedness by people who were earnestly seeking light on educational procedures.

At that time the terminology of the educator was simple and, because of this simplicity, it is not surprising that even those in the lower quartile of educators could understand what their associates were talking about. In keeping with this simplicity these meetings came to be classified under the general title of "Bull Session." The effectiveness of these meetings may be judged by the fact that the practice and the title are still in use in some areas. In order to verify this we need only observe the frequency with which they are conducted in the hotel lobbies during our professional conventions.

In contrast to this simple method of exchanging ideas we find that the modern educator has tended to dignify such meetings by inventing new names for them. An ultra-scholastic professor introduced the "Seminar" and foisted it on an unsuspecting student-body. From our observation of many of these seminars, they might be classified under the older and more generally understood title discussed above.

Another worthy soul discovered the "Conference." This has become popular and has become a part of our everyday life. Here again most conferences are merely "Bull Sessions" divested of their original aura of good fellowship.

And who has not heard educators propose to have a "Panel"? From our observation a panel is merely a bull session which, like Gaul, is divided into three parts. There is a moderator; then there is the group which is privileged to pass the buck back and forth; and then there are the listeners who are condemned to silence when they are filled with a desire to take issue with their more fortunate brethren who enjoy the privilege of free speech. Is this not a bull session of sorts?

But the most recent one to appear on the educational horizon is perhaps the most intriguing of them all. It is relatively new and because of this has not yet come into general use. Brethren, let me introduce you to the "Colloquium."

Information has come to us that the learned professor who discovered this expression was lazily pawing through

(*Continued on page* 28)

PLEXIGLAS

.060
to
2.000 thick

in clear transparent, also colors .060 – .125 .187 – .250 (transparent translucent & opaque)

Immediate delivery from stock

•

WRITE US FOR SPECIAL OFFERINGS

•

TRANSILWRAP COMPANY
2814 W. Fullerton Avenue
Chicago 47, Illinois

WINSTED EDGE TOOL WORKS WINSTED, CONNECTICUT
Sales Representatives: JOHN H. GRAHAM & CO., INC., 105 DUANE STREET, NEW YORK 8, N. Y.

STURDY — LOW COST

BURKE
BENCH MILLERS

are ideal for and widely used as practical instruction tools in many

SCHOOL SHOPS

Accurate Burke Milling Machines perform all standard metal milling operations in the simplest manner at least possible investment.

Send for complete data on models attachments, accessories and suggestions for putting Burke's to work for your profit.

THE U. S.-BURKE MACHINE TOOL DIV.

BROTHERTON ROAD 8 **CINCINNATI 27, OHIO**

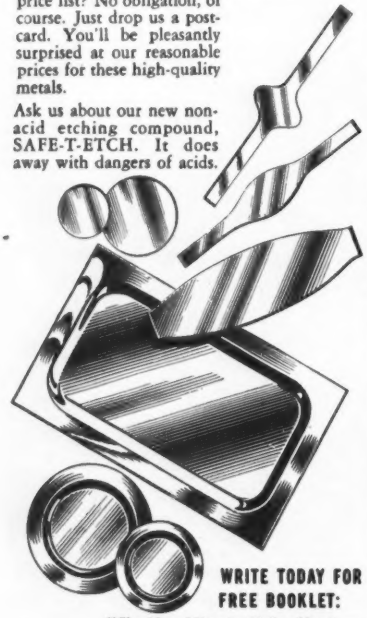
Gives students added thrill of accomplishment!

When you supply your classes with our Super-Brite MIRROR-Finish Aluminum and other specially-prepared craft metals, you give their projects the benefit of the best. Students are assured of a better start . . . the added pleasure of a superior result. Metal Goods Corporation's aluminum, brass, copper and stainless steel are a solid foundation on which to build up a *stronger sense of achievement.*

Available in circles (flat or preformed), in rectangles (flat or preformed), in bracelet blanks and other shapes . . . for etching, painting, hammering, stippling and other treatments . . . in making trays, coasters, bracelets, medallions, pendants, plaques and many different metal items . . . *Metal Goods Corporation's craft metals are tops!*

May we send you our descriptive literature and price list? No obligation, of course. Just drop us a postcard. You'll be pleasantly surprised at our reasonable prices for these high-quality metals.

Ask us about our new non-acid etching compound, SAFE-T-ETCH. It does away with dangers of acids.



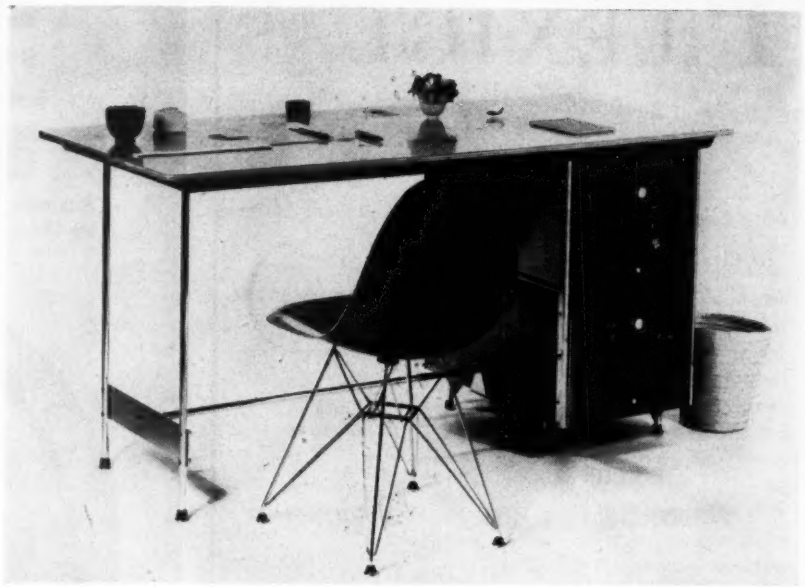
WRITE TODAY FOR FREE BOOKLET:
"The New Way to Make Aluminum Trays and Coasters!"

"HEADQUARTERS FOR THE NATION'S FINEST CRAFT METALS SINCE 1935"

METAL GOODS CORPORATION
CRAFT DIVISION
METAL GOODS CORPORATION
615 ROSEDALE AVE.
ST. LOUIS 12, MO.

Project Design

What the industrial designers are doing (one of a series)



DESK

Designer: CHARLES EAMES
Manufacturer: HERMAN MILLER FURNITURE CO.

THE feeling of massiveness which so often characterizes desks is missing in this modern design which instead creates a sense of lightness and utility. Both this desk and the molded plastic chair were selected for inclusion in the 1953 Good Design Exhibition sponsored by the Museum of Modern Art of New York and Chicago's Merchandise Mart.

The desk is made of wood (either birch or walnut) and chrome-plated steel. The top is all of 60" long to provide an extremely spacious work surface. The drawers are standard letter-file drawers with stops to prevent their being pulled too far out. Special drawer fittings include a sliding pencil tray and a letter file. The legs are of chrome-plated steel as are the cross member and the footrest.

Charles Eames, the designer, has established a new pattern in the concept of chair design with molded plastic and plywood to fit body contours that has gained wide public acceptance. In this desk his creative ability is apparent in the interesting and functional use of materials and the relationships of the various masses which results in a feeling of lightness. ★

Dust . . . . . . *from page 26*

a copy of Webster in a valiant attempt to fill in his spare time between classes when, by accident, he discovered the word resting peacefully in its allotted space. As he pondered over the definition, he was amazed to find a similarity between it and the old-fashioned "Bull Session." He was delighted with his discovery since it placed him in a position to mystify his colleagues who, being less erudite, had missed the significance of the term. And so there was launched on the educational world a new term to add further to the confusion of the uninitiated.

Our scholars study Greek and Latin although some people classify them as dead languages. In view of this, why is it that educators fail to study the dead language of the pedagog? It was a simple language which could be understood by simple people. A spade was not an agricultural instrument and a bull session was not a colloquium.

May we suggest, therefore, that we curb our inventive genius for creating new and obscure titles. Let us glorify the old-fashioned "Bull Session" and thus perpetuate an expression which will not mislead the graduate student who might be lured into electing a colloquium in the belief that he is about to have a new experience. ★

Weldit
SINCE 1918

the name no "break" could make . . .

For 35 years Weldit Torches have been accepted as a standard of quality throughout industry. No matter what the application, either in welding or cutting, a Weldit Torch will do it more efficiently, more economically, and at less cost.

Illustrated—
The famous
Weldit Weldimatic
Welding Torch

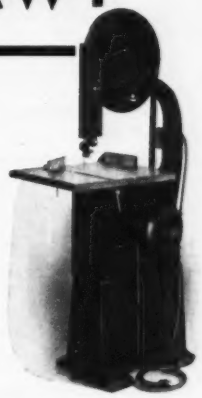
CANADIAN DISTRIBUTOR:
ALLOY METAL SALES
181 Fleet St. E.
Toronto 5, Ontario, Canada

990 OAKMAN BLVD. Weldit INC. SINCE 1918 DETROIT 6, MICHIGAN

"OLIVER"
18-inch
BAND SAW

Does finest work!

It's the most complete Band Saw of its size



The "Oliver" junior size motor-on-shaft Band Saw has many refinements and adjustments developed for the larger "Oliver" Band Saws. Table measures 24" x 20"—heavily ribbed, accurately machined. Tilts 45° to right. Has miter crosscut gauge and parallel ripping fence. Takes 9" under guide, 18" between saw and column. Rips to 11" wide, miters and crosscuts to 6½". A sturdy Band Saw . . . precision built for years of service. Write for Bulletin No. 192-D.

"Oliver" Band Saws also made in 30", 36", 38" sizes.

Ask for details.

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

BIG NEWS!

Both *Inch-Pound* and *Foot-Pound* Models of Amazing PROTO Torquer Now Available!

Announced in January! Over 30,000 bought by March 31!! That's the whirlwind success story of the sensational PROTO torque-*limiting* wrench. In addition to foot-pound models, you can now buy *inch-pound* styles and these handle thousands of jobs. Buy the model you prefer from your PROTO dealer today! Send 10¢ for 68-page catalog of entire line to

PLOMB TOOL COMPANY
2205Z Santa Fe Avenue,
Los Angeles 54, Calif.

Fastest Torquer in the World!
★ Automatic Torque-Limiting Release
★ NO Dials, Scales or Pointers to Watch or Break
★ Ratchet Head Models Save Time
★ Accurate Micrometer-Type Adjustment
★ Trouble-Free Construction

5383

Eastern Factory:
Jamestown, N.Y.
Canadian Factory:
London, Ont.

PROTO PROFESSIONAL TOOLS

complete lumber service
FOR SCHOOL SHOPS

WE KNOW, AND CAN SUPPLY, THE EXACT LUMBER YOU NEED

Supplying the right kind of lumber and service for Industrial Arts and Vocational Education Classes is a specialized business. It requires professional knowledge of grade, dryness, workability and service which Shop Instructors should expect—and receive.

Our Educational Lumber Division knows your requirements and is organized to supply them promptly and efficiently from our large inventory of "ready-to-ship" thoroughly kiln-dried lumber.

No advance in prices as shown in Catalog No. 53. • MAIL US YOUR ORDER TODAY.

HARDWOOD CORPORATION OF AMERICA
EDUCATIONAL LUMBER DIVISION
ASHEVILLE, NORTH CAROLINA

APPALACHIAN HARDWOODS
AMERICA'S FINEST

ASH
BASSWOOD
BEECH
BIRCH
CHERRY
MAPLE
POPLAR
RED OAK
WALNUT
WHITE OAK
PHILIPPINE MAHOGANY
HONDURAS MAHOGANY
AROMATIC RED CEDAR
CHESTNUT
WILLOW
BALSA

McKnight Publications

#2—
"Machine Woodworking"

By Robert E. Smith. Detailed instruction for operation and care of lathes, grinders, saws, jointers, planers, mortising machines, shapers, routers and sanders. 224 illustrations. Stresses safety procedures throughout and gives related information. 152 pages..... **$3.00**

#26 "Finishing Materials and Methods"

By George A. Soderberg. New 1952. This is the first complete book published on finishing in many years. It discusses up-to-date materials and processes, safety and health hazards. 26 "how to" units give easy-to-follow instructions on wood surfaces, metal finishes, flocking, dry wall construction finishes and numerous other recent developments. 320 pages with 189 illustrations, cloth bound..... **$4.00**

CHECK THE BOOKS YOU WANT:

GENERAL SHOP BOOKS:

#79—GENERAL PLASTICS—PROJECTS AND PROCEDURES 1.75
#30—GENERAL SHOP METALWORK 1.25
8—GENERAL SHOP ELECTRICITY 1.25
1—GENERAL SHOP WOODWORKING 1.25
#40—BENCH METAL WORK 1.00
#39—SHEET METAL WORK 1.00
#34—ENGINE LATHE OPERATIONS 1.80
#41—ETCHING, SPINNING, RAISING AND TOOLING METAL 1.25
#90—CARVING ANIMAL CARICATURES 1.50

FILM STRIPS FOR WOOD SHOPS:

6—Set of 6 colored film strips, boxed 31.50

CLIP THIS:

McKNIGHT & McKNIGHT
Dept. 217, Market & Center Sts.
Bloomington, Illinois

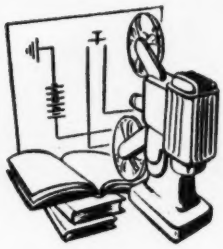
Send me #2, #26, #79, #30, #8, #1, #40, #39, #34, #41, #90, #6 (circle ones desired) for FREE 30 DAY TRIAL. I will either return books or strips in 30 days and owe nothing—or send you $ ..... in full payment.

Name .....

Address .....

City ..... Zone ..... State .....

Instructional RESOURCES



Books:

Teaching Successfully the Industrial Arts and Vocational Subjects. Silvius and Curry. Bloomington, Ill.: McKnight and McKnight Publishing Co., 1953. Pp. xvii+339. $4.50.

Teachers and teacher trainers who believe in clearly organized teaching will welcome this book as a worthwhile addition to their libraries. It offers helpful suggestions for the teacher on the job, but it will be particularly valuable in college classes where the students are being oriented into the various techniques used by efficient teachers in preparing themselves for the numerous tasks involved in the teaching process.

The book is divided into seven sections. The first of these deals in detail with the problems that arise when starting a class, including the mechanics of orientation, assignment of work stations, and student accounting.

Effective methods of teaching are dealt with, and illustrations are given of how to obtain the best results from a group of students. The organization of an effective safety program is dealt with, and the evaluation of teaching is considered. In all of these areas considerable information is provided which should be helpful to teachers.

The authors are to be congratulated on having brought together in one volume a vast amount of material related to the many responsibilities of teachers.

G. Harold Silvius is Professor of Industrial Education at Wayne University, Detroit, Mich. Estell H. Curry is Head of the Vocational Department, Jefferson Intermediate School, Detroit, and is a critic teacher on the staff of Wayne University.

Practical Upholstering. New York: McGraw-Hill Book Co., Inc., 1953. Pp. vii+296. $4.50.

This is a practical text which will be of value to shop teachers who are interested in this type of work, as well as to professional and nonprofessional home decorators. It explains in simple terms the fundamental processes followed in the upholstering trade. These processes are illustrated by numerous pictures and diagrams which clarify the text for those who lack the practical background of the tradesman.

The book was prepared by the instructional staff of the Commercial Trades Institute, Chicago, Illinois.

Modern Woodworking Projects. Turnbull. New York: The Macmillan Co., 1953. Pp. vi+122. Paper bound. $4.00.

This book is intended to be used as a guide in the construction of wood projects in the school shop or in the home workshop. It contains directions for the making of a variety of articles of wood. Some of these may be made by hand while others call for the use of machines.

The book is profusely illustrated with pictures, sketches, and diagrams which simplify the task of the worker in performing the numerous operations required.

Teachers will find it an excellent addition to their shop libraries, and home craftsmen will find it to be a helpful source of ideas. The excellent design of most of the projects is specially noteworthy.

J. S. Turnbull is an instructor in the James Monroe Junior High School, Seattle, Washington.

Elements of Heat Treatment. Enos and Fontaine. New York: John Wiley & Sons, Inc., 1953. Pp. 286. $5.00.

This is a technical book which is intended for engineers who are concerned with certain phases of metallurgy. It will appeal strongly to people in the industrial world since the heat treatment of metals is one of the most important processes in modern industry and would be useful on the reference shelf in the school metal shop.

The late George M. Enos was a Professor of Metallurgical Engineering and William E. Fontaine is an Associate Professor of Mechanical Engineering at Purdue University.

Automotive Collision Work. Frazee and Spicer. Chicago, Ill.: American Technical Society, 1953. Pp. x+323. $4.95.

This book, another in the Frazee-Bedell automotive series, describes what must be done to repair damaged autos and how to develop the skills needed to perform such work.

Every phase of repair is treated: welding, cutting, bumping, shrinking, soldering, metal finishing, door aligning, and frame straightening. The book also has a valuable section on estimating repair bills. The book is well illustrated and should prove valuable to those teaching auto shop.

Irving Frazee is supervisor of the service department technical publications section for Ford Motor Company, and Edward D. Spicer is senior technical writer for the same organization.

Electric Fix-It Book. Chicago: Popular Mechanics Press, 1953. Pp. 160. $2.00.

Another one of the Popular Mechanics how-to-do-it books, this volume covers such topics as wiring the home for modern lighting, repairing electrical appliances, making lamps from odds and ends, building electrical devices for the home and shop, and hints on soldering and installation.

Some of the electrical kinks and suggestions

Do You Teach GRINDING?

These 20" x 30" Wall Charts are helping instructors in vocational, industrial arts, and industrial training courses.

Each set of 8 charts includes:

NOMENCLATURE OF GRINDING MACHINES	ABRASIVE INFORMATION
10" Cylindrical Grinder	"Family Tree" of Abrasives
10" Universal Grinder	Truing and Dressing
#20 Cutter and Tool Grinder	Sharpening Milling Cutters
8" Hydraulic Surface Grinder	Grinding Wheel Components

These charts, mounted on 70 lb. stock are suitable for hanging or easel display. They are available at $4.75 per set.

For charts, or free 172 page manual, (instructors only) "Lectures on Grinding, Abrasives—Machines—Methods" write to

NORTON

Educational Service Section
NORTON COMPANY
17 New Bond Street, Worcester 6, Massachusetts

SAVE on Plastics

FOR SCHOOL SHOP PROJECTS!

Colored Plexiglas Assortments

in translucent, opaque and transparent reds, blues, greens, greys, whites and others.

NEW LOW PRICES

10 LBS. $9.50

20 Lbs. $17.00
40 Lbs. $30.00
100 Lbs. $70.00

Finest quality and the best colors in all new, flat, paper-masked Plexiglas. Sizes 6" x 12" and larger in the assortment.

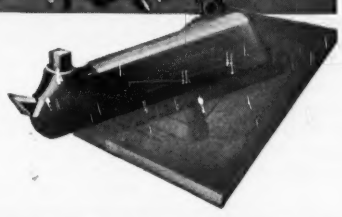
Write for new, Free Booklet "How to Work With Plexiglas" and "Handy Conversion Table."

Cadillac Plastic Co.

15111 SECOND BLVD.,
DETROIT 3, MICHIGAN
Chicago Warehouse: 727 W. Lake St., Chicago, Ill.

ARMSTRONG

Teach with the standard tools of industry.



Write for Catalog

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5252 W. Armstrong Ave. Chicago 30, U. S. A.
New York, San Francisco

MAYLINE

MAYLINE
Has Furniture for Your Classroom

This C-7702 Art Table has a 20" x 24" metal edge, adjustable, drawing top and a 10" x 20" metal edge reference top. Base and utility drawer is of oak finished golden oak.

Drawing table C-7703B has 30" x 42" solid basswood, metal edge, adjustable top. Roomy drawers are individually keyed. Board compartment holds six boards 21" x 26". Base is Oak finished golden oak.

Symbol of MAYLINE *Superiority*

MAYLINE COMPANY
formerly
ENGINEERING MFG. CO.
607 N. Commerce St.
Sheboygan, Wis.

MAYLINE
MAYLINE
MAYLINE

ANNOUNCING....

BASIC MATHEMATICS SIMPLIFIED

C. Thomas Olivo

432 pages, illustrated, clothbound
$3.75

This new publication is designed to meet the need for basic instructional material in mathematics. Through carefully prepared instructional units which explain each principle and show its application, this material presents the fundamental principles and concepts of mathematics.

A unique feature of this new publication is the inclusion of *Supplementary Practical Applications* which are found at the conclusion of each unit. These Supplementary Practical Applications refer by page number to our series of Related Mathematics Workbooks, thus providing for specific trade application of each principle discussed.

This basic text then serves as the core of the mathematics program . . . it is used in conjunction with related mathematics workbooks where specific trade application is desired . . . it is used alone where the emphasis is solely on developing a good general background of basic mathematical skills.

Check titles you wish sent for 30-day Examination

- ☐ **BASIC MATHEMATICS SIMPLIFIED**
- ☐ **Math for Carpenters**
- ☐ **Math for Masonry Trades**
- ☐ **Math for Auto Trades**
- ☐ **Math for Painters**
- ☐ **Math for Plumbers**
- ☐ **Math for Electrical Trades**
- ☐ **Math for Needle Trades**
- ☐ **Math for Machine Trades**
- ☐ **Math for Printers**

Name .....
School .....
Address .....
City ..... Zone .....
State .....
S-14

DELMAR *Publishers*
INCORPORATED
ALBANY 1, NEW YORK

are novel—yet practical. Included in the book are many valuable short cuts in working procedures.

The book, in addition to its general informative quality, could be useful as a source of project ideas for industrial-arts instructors in electricity.

TV Sweep Alignment Techniques. Liebscher. New York: John F. Rider Publisher, Inc., 1953. Pp. 123. $2.10. (Paper bound.)

This technical book is designed to show how sweep alignment can be used to peak align certain tuned circuits with the accuracy of meter alignment. It introduces the Supermark method of oscillator alignment, a marker created by a reversal of superheterodyne action.

The book, which is definitely written for TV technicians and advanced students rather than beginning students, discusses sweep curves, tuner curve formation, intermediate frequency alignment, intermediate frequency curve adjustment, and sound i-f and sound detector alignment. Video amplifier response testing and UHF sweep alignment also are covered.

Pamphlets:

Suggested Courses of Instruction in Industrial Arts for the Junior-High-School Level is a 48-page booklet prepared by a California Industrial Arts Committee composed of Kermit A. Seefeld, chairman, Dale Easter, J. Lyman Goldsmith, John M. Groeble, Claude E. Nihart, Kenneth Phillips, William B. Steinberg, David O. Taxis, Glenn D. Warrick, and Robert L. Woodward, consultant. The publication contains courses of instruction in the areas of drawing, general wood, general metal, electricity, handicrafts, and graphic arts, as well as sections devoted to the general shop. Available from the Bureau of Textbooks and Publications, California State Department of Education, Sacramento. Price $.50 each.

Let's Get Together. Bulletin No. 299 of the Michigan Department of Public Instruction, Office of Vocational Education, lists the different viewpoints of some administrators and industrial-arts shop teachers regarding shop aims and operation and presents a "common ground" based on the interest of the student. Single copies available free from the Michigan Office of Vocational Education, Lansing.

Audio-Visuals:

The Fossil Story, newest film to be released by the Shell Oil Company shows how men in industries such as oil and steel utilize vestiges of prehistoric life in their work. Photographed in color, this 16mm film runs 19 minutes. Available free on request to the Shell Film Library, 50 W. 50th St., New York 20, N.Y., or 100 Bush St., San Francisco, Calif.

Care and Repair of Hand Tools, Sharpening Hand Tools, Sharpening Auger Bits and Twist Drills, Sawing, Planing and Smoothing Wood, Laying Out Common Rafters and Open Stairs and **Soldering** are the titles of a new series of silent filmstrips on shopwork now available from the Text-Film Department of McGraw-Hill Book Company, 330 W. 42nd St., New York 36, N.Y. Price $30 for the set or $5.50 for each filmstrip.

It's In the Air, a 20-minute film in color relating the story of air conditioning's role in the average home and in business and industrial life, has been released by the Airtemp Division of Chrysler Corporation, 1600 Webster Avenue, Dayton 1, Ohio. Available on free-loan basis.

HOW ARE YOU FIXED FOR

PLASTICS?

To be SURE You Have Plenty for Classroom Projects—Send for FREE Copy of Our BIG NEW Plastics Price List!

It gives full details and lowest school prices on everything you need. Quick delivery to any part of the country on such items as:

- Plexiglas
- Cellulose Acetate
- Fiberglas-Polyester Plastic
- Screw Driver Handle Stock
- Castolite
- Nylon Rods
- Plastic Foam
- Polyplastex
- Molding Powders and Presses
- Cold Setting and Hot Melt Casting Resins
- Dyes—Cements
- Jewelry Findings
- Manuals
- Finishing Compounds —and others

Wonderful New Shop Project—Build SPORTS CAR BODIES and Boats of Fabulous Fiberglas Polyester Plastic

Create new interest . . . a wave of excitement among your students by adding these, and many more unusual projects, to your plastics course. New wonder material is easy to work with, strong, practical. Write for complete instructions today!

Send for Plastics Price List Now—

OVER 3000 ITEMS IN STOCK!

In addition to the Price List that's packed with data you'll find useful when ordering, you also get our Jewelry Findings Catalog and Information on Fabrication of Plastics to round out your buying guides for all plastic craft needs. Don't delay—write today!

PLASTIC PARTS & SALES
1157 S. Kingshighway Bl. St. Louis 10, Mo.

New and Important

THE DOUBLE-PURPOSE HIGH SCHOOL

Closing the Gap Between Vocational and Academic Preparation

By Franklin J. Keller
Principal,
Metropolitan Vocational High School, N.Y.C.

An explanation and a brief for greater public support of the "double-purpose" high school, which answers the needs of a growing number of students who want occupational as well as academic training. "Stimulates one to consider what goes on in the public schools and what the vocational schools in particular are doing about it."—LAWRENCE F. ASHLEY, Chief, Division of Vocational Education, Yonkers Board of Education.

$3.00 at your bookstore or from

HARPER & BROTHERS, N. Y. 16

CONTENTS

Principles of Good Shop Planning
Planning the New School Shop
Pertinent Planning Pointers
Planning for Industrial Education
Improving Shop Layouts for the Industrial-Arts Program
Planning the Vocational School
Safety Factors in Shop Planning
Selected References for School Shop Planning
Plan for Safety in Purchasing
Principles of Purchasing
Requisition Hints
General Shop:
- New General Shop Ideas
- Planning the General Shop
- Modern General Shop Plans
- Equipping the General Shop

Auto Shop:
- New Automotive Shops
- Planning the Auto Shop
- Equipping the Auto Shop

Drafting:
- New Drafting Rooms
- Planning the Drafting Room
- Equipping the Drafting Room

Electricity and Radio:
- New Electrical, Radio, and TV Shops
- Planning the Electricity and Radio Shop
- Equipping the Electricity Shop
- Equipping the Radio Shop

Graphic Arts:
- New Graphic Arts Shops
- Planning the Graphic Arts Shop
- Equipping the Graphic Arts Shop

Machine Shop:
- New Machine Shops
- Planning the Machine Shop
- Equipping the Machine Shop

Metalworking Shops:
- New Metalworking Shops
- Planning the Metalworking and Welding Shops
- Equipping the Metalworking Shop
- Space Requirements for Machinery

Woodworking Shops:
- New Woodworking Shops
- Planning the Woodworking Shop
- Equipping the Woodworking Shop
- Space Requirements for Woodworking Machines

State Legal Provisions Affecting Shop Design

Modern School Shop Planning

The only book on the market today which gives you complete up-to-date information on planning for all types of school shops. Contains 37 diagrams and charts and 102 photographs, including pictures of well planned new shops recently built throughout the country. Here is a book that answers all the perplexing questions on planning, laying-out, and equipping the school shop, small or large. Contains definite, practical suggestions, not only for overall planning, but also for individual shops such as General Shops . . . Auto Shops . . . Drafting Rooms . . . Electrical, Radio & TV Shops . . . Graphic Arts Shops . . . Machine Shops . . . Metalworking Shops . . . Woodworking Shops.

This book is especially designed for you:
If you are in a school system where a new school is to be built.
If you are soon moving into a new shop.
If you are planning additions to your present shop set-up.
If you are contemplating changes in your shop.

Just off the presses.

Use the coupon.

Send for your copy now.

Teacher-Trainers: This is an ideal book to use when covering the topic of shop planning.

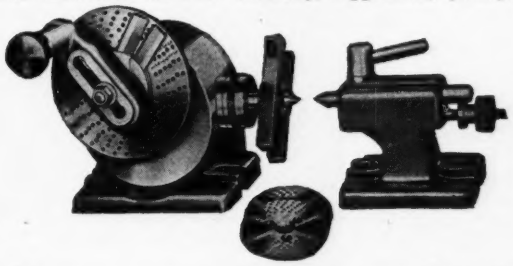
113 Pages — Plastic Bound

139 Illustrations — $2.50

PRAKKEN PUBLICATIONS
Ann Arbor, Michigan
Send me a copy of the new book
MODERN SCHOOL SHOP PLANNING
☐ I am enclosing $2.50.
☐ Please bill me. ☐ Please bill my school.
Name .....
Address .....
City ..... State .....

OUTSTANDING VALUES BY AMERICA'S LARGEST BUILDERS OF DIVIDING HEADS

You can't beat them for accuracy, ruggedness, quality.



L-W Model SD 6½" Swing DIVIDING HEAD

Spindle Threaded 1½"-8 to fit L-W 5" Universal Chuck
• ACCURATE • RUGGED • 36 LB.
• QUALITY CONSTRUCTION Only $132.00

Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 96T. Index chart shows all divisions obtainable to 380. Right or left hand models.

Model BP 11" Swing for plain milling machines. Shipping weight, 140 lbs. **$225.00**

Model AU 11" Swing. Fully Universal for complete indexing and spiral cutting. Shipping weight, 190 lbs. **$327.50**

Order from your industrial supply distributor or order direct, giving name of your distributor. Immediate Delivery

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products
L-W CHUCK COMPANY
50 ST CLAIR

Free TO INSTRUCTORS

HUNT'S BIG NEW WOODWORKERS CATALOG NO. 20

144 PAGES OF BARGAINS AT NEW LOW PRICES

Filled with greatest selection of--fine domestic and imported woods...mouldings...tools...machinery...cabinet hardware...fittings--at real money-saving prices.

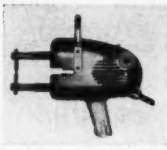
Illustrates 32 rare and fancy woods, 54 multi-colored bandings, 40 inlays and overlays--in color. Also--31 embossed mouldings, 24 carved ornaments, 275 scroll patterns. And--51 pages of all kinds of tools and supplies plus pages of ideas, instructions, information. Save money, save time--send for your free copy NOW.

QUICK DELIVERY
One board or a carload
Maple, poplar, oak, mahogany, cherry, walnut, red cedar and many others--all properly seasoned and kiln dried and all correctly graded.

CRAFTSMAN WOOD SERVICE CO.
2727 SOUTH MARY STREET Dept. K-1
CHICAGO 8, ILLINOIS
Please send me HUNT'S WOODWORKERS CATALOG No. 20--free to instructors. (Students 15c)
NAME.....
ADDRESS.....
CITY..... ZONE..... STATE.....

536K Multimeter Kit $12.90
Wired $14.90
1000 ohms/volt
425K 5" Scope
Kit $44.95.
Wired $79.95.
YOU BUILD
EICO
KITS
IN ONE
EVENING-
but they
last a lifetime...
and you
save 50%
221K VTVM Kit $25.95.
Wired $49.95.
33 INSTRUMENTS -
the Industry's most complete
line of MATCHED
TEST INSTRUMENTS
565K Multimeter Kit $24.95.
Wired $29.95.
20,000 ohms/volt.
¼ - million EICO Instruments are now in use the world over! That's the proof of EICO's leadership in Value.
NEW 377K
Sine & Square Wave Audio Gen.
Kit $31.95. Wired $49.95
For latest precision engineering, finest components, smart professional appearance, lifetime performance and rock-bottom economy — see and compare the EICO line at your jobber's today before you buy any higher-priced equipment! You'll agree with over 100,000 others that only EICO Kits and Instruments give you the industry's greatest values at lowest cost.
360K Sweep Gen.
Kit $34.95. Wired $49.95.
Write NOW for
FREE latest Catalog
SS-1
1040K Battery Elim.
Kit $25.95. Wired $34.95.
Laboratory
Precision
at Lowest Cost
Prices 5% higher on West Coast.
625K Tube Tester
Kit $34.95.
Wired $49.95.
Reg. U.S. Pat. Off.
EICO
©1957 INSTRUMENTS & KITS
ELECTRONIC INSTRUMENT CO., Inc.
84 Withers Street, Brooklyn 11, N. Y.

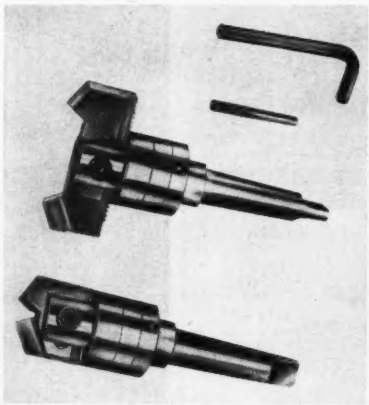
Portable Spot Welder Features Electronic Timing Control



The Ampower portable spot welder, Model 5201, features a timing control enclosed within the unit itself, therefore eliminating the expense of a wall timer. It welds most alloys of aluminum sheets, steel, mild and stainless as well as galvanized and cadmium plated. A pistol grip makes for easy operation and is helpful in hard-to-reach places. It weighs only 26 pounds and can also be mounted on a stand and put to use as a floor operated model.

For further particulars write to the Ampower Products Co., 5737 W. 87th St., Oak Lawn, Ill., mentioning SCHOOL SHOP; *or circle no. J1 on the business-reply card.*

Hayden Designs Adjustable Drill



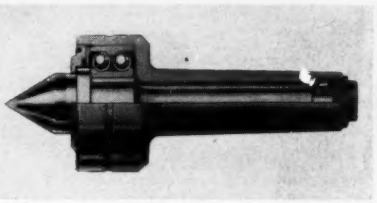
Of greatest value when used on drill presses and radials, where its balanced cuts work ideally with the normal spindle construction of such machines, is the new adjustable drill made of heat-treated alloy steel with blades of high-speed steel. It can also be used on horizontal boring mills, vertical jig borers, milling machines, turret or engine lathes. The blades are easily modified to produce round corners, flat bottoms, angular surfaces, steps, etc.

For folder giving description and prices, write the Hayden Twist Drill Co., 8626 Lyndon Ave., Detroit 38, Mich., mentioning SCHOOL SHOP; *or circle no. J2 on the business-reply card.*

Mayline Company Is New Name For Engineering Manufacturing

Mayline Company, Inc., is now the official name of the former Engineering Manufacturing Company of Sheboygan, Wisconsin. Change in the corporate name has been approved by the State of Wisconsin. For the past three years the trade name "Mayline" has been used to identify the company's high-quality drafting and art furniture and equipment.

RED-E Ball and Roller-Bearing Centers



Answering the need for a general purpose anti-friction center that can be used with all types of turning machines, particularly those jobs that require heavy radial and thrust loads, the new RED-E Center features an increased head size that permits the use of larger bearings. Preloaded anti-friction ball bearings are in a double-row arrangement housed in the head, plus a selfaligning precision roller bearing in the shank. The labyrinth is made so that no cutting oil or chips can enter nor can the selfenclosed lubrication escape. For information and prices write for RED-E catalog No. B-483R to the Ready Tool Co., 554 Iranistan Ave., Bridgeport 5, Conn., mentioning SCHOOL SHOP; or *circle no. J3 on the business-reply card.*

Allen Uni-Tuner Will Save Time On Engine Tests

Recently developed by the Allen Electric & Equipment Company is a new electronic device which enables a complete and precise test on every phase of an engine's operation

How to Obtain Items Listed in "News from Industry"

The business-reply card inserted between the last page and the inside rear cover of this issue of SCHOOL SHOP has numbers on it which may be circled to secure "News from Industry" items. Please be sure to circle the numbers which apply to "News from Industry" and are preceded by the letter "D." No stamp is required.

COLUMBIAN VISES

COLUMBIAN WOODWORKERS' VISE

COLUMBIAN MACHINISTS' VISE

COLUMBIAN WORKSHOP VISE

COLUMBIAN HINGED PIPE VISE

Columbian is the world's largest manufacturer of vises. Your students, as they enter industry, will find Columbian Vises handling thousands of necessary jobs in leading plants.

So—specify Columbian and train your students on the same vises they will use in industry.

COLUMBIAN *Vises* THE COLUMBIAN VISE & MFG. CO. CLEVELAND 4 OHIO

world's largest maker of vises

STANDARD CARRIAGE CLAMP

Individually Power-Tested for Better Performance

No. 540

EXCLUSIVE FEATURES

Tested frame, Heat treated Screw, Steel Wing, Steel Tip.

The Standard Clamp is preferred by the larger users of such tools, because of its superior design and construction. The Power Test given each Hargrave Clamp on our Hydraulic Testing Machine assures satisfaction to the user.

WRITE FOR CATALOG: Showing A CLAMP FOR EVERY PURPOSE, openings from ¾" to 12' and depths from ½" to 16", also Chisels, Punches, Star Drills, Brace Wrenches, Washer Cutters, File Cleaners, etc.

THE CINCINNATI TOOL COMPANY

4059 Montgomery Rd., Cincinnati 12, Ohio

FREE!

TO INDUSTRIAL ARTS INSTRUCTORS

Fabricating Manual for Plastics

Write today for your copy of this up-to-date, information MANUAL, describing such operations as sawing, carving, cementing, casting, etc. Also included is our latest catalog of plastic materials and findings and **special school discount** allowance. Send your name and address. Your FREE Manual will be sent by return mail.

HOUSE OF PLASTICS 8648 Linwood Detroit 6, Mich.

SPEEDY-MELT

METAL MELTING FURNACE

Gas-fired: will use any type gas; manufactured, mixed, natural, bottled, cylinder.

No. B 1½ Speedy Melt Furnace Capacity in brass 55 lbs.; aluminum 16 lbs.; Grey iron 55 lbs. Complete with Blower and Crucibles..$295.00

WRITE FOR INFORMATION ON SMALLER OR LARGER FURNACES

McENGLEVAN HEAT TREATING AND MANUFACTURING CO.

708 Griggs Street Danville, Illinois

REDUCE COSTS ON "SMALL-WORK" GRINDING & FINISHING JOBS with Foredom FLEXIBLE SHAFT MACHINES

- FEATHERWEIGHT, finger - tip - controlled handpiece (pencil size or larger) which eliminates operator fatigue.
- CHOICE OF 5 HANDPIECE TYPES (all instantly interchangeable). You fit the handpiece to the job at hand.
- EXTRA GOOD FLEXING QUALITIES in the flexible shaft assembly for effortless maneuverability.
- LONGER MOTOR LIFE because motor is not dwarfed to fit the hand.
- HIGH SPEED (14000 RPM) which does not drop precipitately under load.
- SILENCER-EQUIPPED flexible shaft for vibration-free performance.
- BENCH OR HANG UP MODELS FOR HEAVY OR LIGHT DUTY

Over 100,000 Foredoms now in use!

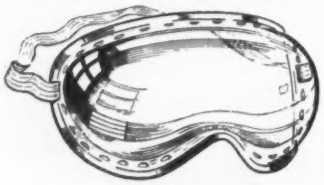
Also flexible shaft tools attachable to your own drill press or motor

Use Foredom to GRIND, POLISH, DRILL, ROUT, CARVE, MILL, SAW, SLOT, CLEAN, SAND, ETCH, ENGRAVE, etc., etc.

Students trained in the use of Foredoms find the experience gained a valuable asset when they start their careers.

Write for Catalog 2764

FOREDOM ELECTRIC CO. Dept. 2764 27 PARK PLACE, N. Y. 7, N. Y.



EYE PROTECTION

BUBBLE - GOGGLES offer the student full upper-face protection against chips, chemicals, dust and sparks. Bubble-like shape guards eye glasses. Ventilated. Comfortable. Light weight.

Made of optical plastic with adjustable head band. Choice of clear, light tints in green, blue and amber.

Only $1.35 Each

Write for School Discount

PAULSON MFG. CORP.

FALLBROOK, CALIF.

MAKE SURE YOU HAVE . . . of Pre-
DonJer's New School Catalog
Selected Project Equipment and Supplies.
Every item selected with the advice of hundreds of teachers. Every DonJer product is practical, useful and fits into your curriculum.

HERE IS YOUR DonJer CATALOG

WRITE FOR YOUR FREE COPY

"SUEDE-TEX" • Golden Touch (23K Gold) • Pearl Essence • Toleware • Liquid Marble • Liquid Lucite • Clays • Glazes • Molds • Tackle B'ld'g Kits • Liquid Plastics • Amaco Ceramic Supplies • Linoleum Dek-All, Silk Screen and Textile Supplies • Block Printing Supplies • Metal Craft Materials

DONJER PRODUCTS COMPANY
51-47 49th Street
Woodside 7, L.I., N.Y.

SHEET METAL BRAKES

Angles, flanges, Pittsburgh locks. 24 G. steel, heavier aluminum. Cam locking, mount on bench, truck or floor stand. Truss braced steel. Express collect. 30" 65 lbs., $28.50. 36", 75 lbs., $33.00. 48", 100 lbs., $48.00. Portabl; stands, 32" ht., 30 lbs., $7.00, with floor stands. 15" size, capacity 16 gauge steel, $21.50.

IRON BENDER forms hooks, angles, eyelets, etc. Capacity ¼ x 2", 5/16 x 1½". 10 parts, all steel, express collect..$9.50

(Immediate delivery. Order direct, cash or C.O.D., or send for folder)

VYKE BRAKE CO., E. 2439 15 ST., DENVER 11, COLO.

LAMP PARTS

SPEEDY 24 HOUR SERVICE on **Lamp parts** from one of the most complete stocks in the country.

SHOP TEACHERS: Send 25c for 64-page catalog containing complete instructions and listing every part necessary to build lamps.

GYRO LAMP AND SHADE CORP.
5402S N. Clark St. Chicago 40, Ill.

in ten minutes or less. As the Uni-Tuner tests are made dynamically with the engine running, the results represent a true picture of the operating condition.

Many tests can now be made that were not possible before and the unit is extremely easy to hook-up and operate. A special program "package" known as the "Power-Tune" has also been developed by Allen, which provides a step-by-step plan of operation.

For more detailed information, write Allen Electric & Equipment Co., 2101 N. Pitcher St., Kalamazoo, Mich., mentioning SCHOOL SHOP; *or circle no. J4 on the business-reply card.*

Frederick Post Develops New Visual Teaching Aid

A new visual teaching aid for instructors of drafting has been designed and developed by the Educational Division of the Frederick Post Company. It is called a "Line Gauge and Lettering Guide" and complies with the most recent reference data as set forth in the *American Drafting Standards Manual.*

Lithographed in attractive color on durable, hard-finished Krome-Kote paper in a convenient size, it provides an easy and quick reference for the student when placed on a T-Square, drawing board, or desk top.

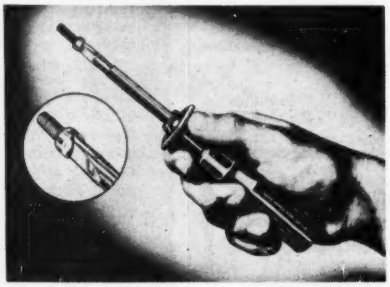
Available free to drafting instructors in quantity for class distribution by writing the Frederick Post Co., 3650 N. Avondale Ave., Chicago 18, Ill., mentioning SCHOOL SHOP; *or by circling no. J5 on the business-reply card.*

Teaching Charts for Arc Welding

The Lincoln Electric Company has organized a typical course in arc welding and developed teaching aids in loose-leaf form for presenting it. The course consists of 13 basic operations to be performed and learned with welding equipment. Each operation is presented in outline form on a 22" x 28" chart for class use. A supplementary manual gives teaching instructions and detailed information and a suggested model teaching schedule.

To obtain this course, write the Lincoln Electric Co., Cleveland 17, Ohio, enclosing $2.00 and mentioning SCHOOL SHOP; *or circle no. J6 on the business-reply card.*

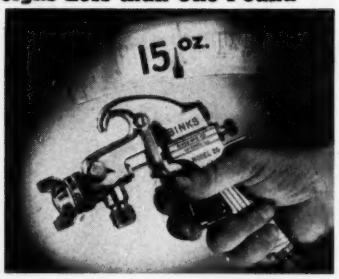
Quick-Wedge Holds, Starts, And Drives the Screw



A specialized screwdriver, called Quick-Wedge, has put an end to dropping screws once and for all. Precision engineered and unconditionally guaranteed, the high-carbon, double-spring steel blade has a hollow-ground bit. The shockproof handle is made of unbreakable Tenite II plastic. It is obtainable in 12 sizes and some models have shockproof plastic-covered tubing for electrical work.

For further information, write the Kedman Co., 233 S. 5th West, Salt Lake City, Utah, mentioning SCHOOL SHOP; *or circle no. J7 on the business-reply card.*

Binks New Spray Gun Weighs Less than One Pound



A new, lightweight, inexpensive spray gun, for use in applying lacquers, synthetic enamels, paints, and all other finishes and coatings of light or medium viscosity, is now being produced by the Binks Manufacturing Company. Featuring an improved design and the use of aluminum, production costs have been cut so that Model 26 can be sold at a low price without the sacrifice of any essential features. A brass fluid passage protects the body from corrosion and erosion caused by many paints and fluids. Large air passages in this gun reduce internal friction thereby reducing pressure drop to a minimum.

Bulletin 26 will be sent without obligation to those who write the Binks Manufacturing Co., 3122 Carroll Ave., Chicago 12, Ill., mentioning SCHOOL SHOP; *or to those who circle no. J9 on the business-reply card.*

New Literature

The Miller that Uses Its Head is a bulletin giving details and specifications on Nichols Millers. It is available free by request from the Nichols-Morris Corp., 76 Mamaroneck Ave., White Plains, N.Y., mentioning SCHOOL SHOP; *or circle no. J10 on the business-reply card.*

Craftool Ceramic Equipment is the title of a new catalog with illustrations and descriptions of a comprehensive line of ceramic equipment and supplies. Included is the new Craftool Treadle Wheel which has many unusual features. Adjustable in height, a 75 lb. balanced fly wheel is mounted on a 1" shaft and runs on two selfaligning ball bearings. The foot treadle can be used for left or right action and has three speeds. For catalog no. 54, write to Craftools, Inc., 401 Broadway, New York 13, N.Y., mentioning SCHOOL SHOP; *or circle no. J11 on the business-reply card.*

Router Bit Catalog. The North American Products Co. announces the release of a new catalog illustrating and describing their carbide-tipped router bit set. These tools are designed for the finishing of laminated plastic tops for counters, bars, cabinets, etc. Recommended by laminated plastic processors, the Woodsman tool guarantees perfect jobs with no danger of marring, chipping or damaging edges of the plastic. To obtain this catalog, write the North American Products Co., 3100 W. Cherry St., Milwaukee 8, Wis., mentioning SCHOOL SHOP; or *check no. J12 on the business reply card.*

Palmgren Products Used in All Industries is the title of a new eight-page catalog recently issued by the Chicago Tool & Engineering Company. The complete line of Palmgren machine-tool accessories is illustrated and fully described, including prices. Available free by writing to the company at 8383 S. Chicago Ave., Chicago 17, Ill., mentioning SCHOOL SHOP; or *check no. J13 on the coupon.*

NOW! JIFFY Carter TIRES

STANDARD EQUIPMENT ON

Walker-Turner Band Saws

Proof of Acceptance is that this manufacturer has joined the ranks of *leading* band saw manufacturers using CARTER Jiffy Tires as standard equipment because

- *Jiffy Tires can be changed in 10 minutes*
- *Provide 2 to 4 times more wear*
- *Provide perfect traction and balance*
- *Jiffy Tires are safe . . . won't throw at any speed*

16" Band Saw
WALKER-TURNER DIV.
Kearney & Trecker Corp.
Plainfield, New Jersey

Available only thru Band Saw Manufacturers

CARTER PRODUCTS COMPANY, INC.

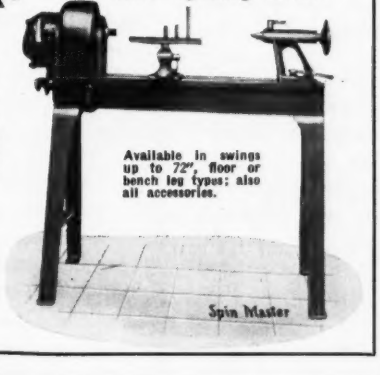
432 Wm. Alden Smith Bldg. 30 Ionia Ave., S. W.
Grand Rapids 2, Michigan

Designed especially for student training . . .
SPIN MASTER® 15" Metal Spinning Lathe

Not a converted wood-turning lathe but a machine specifically engineered for the fast production spinning of the lighter gauge metals . . . the identical equipment your students will operate in industry.

Write For Particulars

Haag Machine Co., Inc.
221 WARBURTON AVE.
HAWTHORNE, N. J.



For Fast, Safe Remelting of Printers' Metal

The NOLAN Remelter

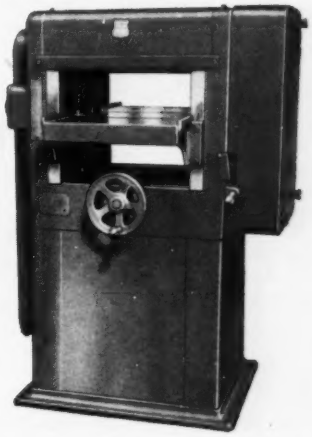
Safe, speedy handling of molten metal is assured with the Nolan Printers' Metal Remelter. Its sensible compact design makes operation simple. This unit will save time, money, space and work for you . . . and quickly pay for itself. Write for details now.

NOLAN Corporation, Rome, N. Y.

PALS THROUGH THE YEARS

POWERMATIC MODEL 12-12" SINGLE SURFACER

FROM SCHOOL SHOP TO INDUSTRY, THIS HEAVY DUTY MACHINE CREATES ITS OWN HISTORY BY ITS OUTSTANDING PERFORMANCE THROUGHOUT THE YEARS



Complete Cast Iron construction. Heaviest designed machine of its size on the Market. All Moving Parts fully Guarded. Maximum Depth of Cut 3/8". Complete information sent on request.

MFG. BY
POWERMATIC MACHINE COMPANY
McMINNVILLE, TENNESSEE

designed for your shop . . . .

Cramped for space? Here's the bench for you! Large, smooth maple top—equipped with four vises—provides ample working room for four students. It's rugged, too, with heavy pressed steel legs withstand the roughest use.

Send for detailed quotation TODAY . . . and ask for Industrial Arts & Vocational Equipment Catalog!

No. 64-50

PARENT METAL PRODUCTS, INC.
400 Locust St., Philadelphia 6, Pa.

Teach Modern Wood Finishing

Sealacell Process

The "Wipe on" Finish

Eliminates Shop Dust Problems

Send for FREE "Facts on Wood Finishing" booklet and new wood finishing manual

General Finishes Sales & Service Co.
1548 W. Bruce St. Milwaukee 46, Wis.

Teachers: Stimulate creative talents. Your students build their desk sets. We supply pen, swivel and funnel.

Combination Pictured Only

$6.25 per Dozen
POSTAGE PREPAID
(Specify No. 36 Change-Point)

Buy direct from manufacturer. FREE Price List describes other combination from $4.25 per dozen.

Gilbert & Miller INC.
693 BROADWAY, N.Y. 12, N.Y.
Pen Makers to the Trade since 1927

Instructor

We supply complete materials, tools, patterns and simple step-by-step instruction books that help to supplement your own personal instruction.
Hundreds of new ideas, projects and designs all clearly illustrated in our big catalog. New low prices on all craft supplies are now in effect.
Write today for your copy of our complete catalog . . . without charge . . . simply request it on your school letterhead.

DEARBORN LEATHER CO.
Dept. K-2
8825 Linwood Ave.
Detroit 6, Michigan

COMPLETE KITS • SUPPLIES
LEATHERCRAFT
METALCRAFT
WOODBURNING
CORKCRAFT
RUBBER MOLDS
SHELLCRAFT
BRAIDING
GLASS ETCHING
FELTCRAFT
BEADCRAFT
AMBEROLCRAFT
-BLOCK PRINTING

PLASTICS
and Supplies

Schools in every state of the Nation use us as their principal source of supply.
We are a leader in the Plastics field. Write for *free* list of plastics, materials, and supplies. Our prices are lower.

PLASTIC SUPPLY COMPANY
2901 N. Grand Blvd. St. Louis 7, Mo.

NEW! Lightweight Shop Coat

Especially designed for the man who works indoors; in a heated room; in warm climates.
$5.00 Each Postpaid — 2 for $ 9.50, 3 for $14.00
MANY PLUS FEATURES in gray-green only sizes 36-46 incl.
Write for Low Prices on QUALITY APRONS and craft items

SCHOOL PRODUCTS COMPANY
47 Great Jones St. New York 12, N.Y.

$2.95 Each or 2 for $5.00!

Genuine Telephone Company Upright telephone complete with cord in Tested and Guaranteed condition. For inter-communication or extension. Complete line of telephones and parts, inter-communication systems, switchboards, handsets, magneto and dial telephones, etc. Write for free list. C.O.D. orders accepted. All shipments F.O.B.

TELEPHONE ENGINEERING CO.
Dept. E-1 SIMPSON, PA.

Washington . . . . *from page 40*

Here Dr. Brownell gave a thumb-nail sketch of the qualifications for the vocational-education chief. He should be a man who knows his special field, said Dr. Brownell, but also one who is "sharply aware of its relationship to the total educational program." He should enjoy the confidence and respect of the practitioners in the states and local communities. He should have imagination and be constantly looking ahead —preparing to solve problems of the future. "And he should fit into the team," added Dr. Brownell, using a phrase popular in the Eisenhower administration.

He didn't say so, but it may be that Dr. Brownell had in mind the Hobby-Rockefeller-Dodge team—the three people who (as Secretary of the Department, as Undersecretary, and as Bureau of the Budget Director, respectively) are responsible for deciding main policy for the Office of Education. And this policy can be summed up thus: "The Office of Education is not an operating agency." What kind of an agency it will become under Dr. Brownell's leadership only the future can tell.

T & I Education and Labor.—If, as Dr. Brownell suggests, the main job of the Office of Education is to "teach" the people about education, then one current project of the vocational division is a most appropriate one. It is an effort to explain to the American Federation of Labor the aims and practices of vocational education.

This effort grows out of the general dissatisfaction of organized labor with some aspects of trade and industrial education. In September, this unhappiness on the part of the AFL expressed itself in a resolution passed at its 1953 convention in St. Louis. Among other things, the resolution called for "a complete knowledge" on the part of labor officials of "the aim, essential characteristics, and operational practices" of vocational education.

To work went the staff of the vocational-education division and prepared an easy-to-read document on the ABC's of vocational education. It was distributed to two audiences: The Office of Education sent copies to the state directors of vocational education, and James Brownlow, chairman of the AFL subcommittee on education, sent it to top AFL officials in the states. With the aid of this informational brochure, labor people and school people should start talking the same language.

Because many a labor leader is unsure of the real aims of vocational education ("Is it to flood the market with undertrained workers who drive down wages?"), the brochure sets forth that the goal "is an American worker-citizen who is competent economically, socially, emotional-physically, and in a civic sense."

Because many a labor leader is unsure of the actual role the federal government plays (for the last 20 years labor has been accustomed to looking toward Washington for solutions to many of its problems), the brochure emphasizes the extent to which courses are initiated by and controlled by local boards of education.

Because many a labor leader is unsure of the meaning of the various types of programs (Are all those various labels really necessary?), the brochure tries to define in simple language the meaning of trade extension, preemployment, part-time cooperative, and so on.

Because many a labor leader is uncertain of the "who-where-how" of apprenticeship (a program labor leaders are very much interested in) the brochure tries to distinguish this phase of training from the other types.

And finally, because many a labor leader is not quite clear where industrial arts fits into the picture, the brochure takes a page to explain that activity.

Apprentice Shortage. — Mention of apprenticeship brings to mind the fact that Department of Labor officials seldom lose an opportunity to point out that the paucity of apprentices presents a "frightening prospect for industry."

The nation needs 2,000,000 apprentices. We have a scant 160,000 registered. If the unregistered were counted, the number would still be about one-eighth of what industry could use.

The factors contributing to the shortage have recently been summed up in the Labor Department as follows: (1) educators who lay too much emphasis in high school on college and white-collar jobs; (2) home and community influences which stress the importance of a "quick buck"; (3) not enough journeymen who can qualify as teachers; (4) lack of publicity to inform young men of opportunities in apprenticeship; (5) and finally, that discouraging first year in apprenticeship when long hours are spent in trivial tasks not connected with training for the future occupation.

Of course, employers and organized labor must take the lead in bringing in more apprentices. But Washington likes the statement recently made by Robert

T. Stoner, state chief of vocational education for Pennsylvania, who said: "For years we men in T and I have been saying 'Apprenticeship is outmoded, it's a dead duck' and we go way out on a limb to prove our point with statistics and occupational analyses. But, all this is just not true. There are over 10,000 apprentices in Pennsylvania and less than 2,000 are getting good related instruction. You and I must share that blame for shortchanging these lads and you and I have the task of setting up and operating a sound instructional program for every apprentice . . . . And when we have it under way, we can expect to see another 10,000 apprenticeships opened up in Pennsylvania industries because an attractive, organized program will bring that many more into the plan within five years. We are going to render that service and we must use the public schools, itinerant teachers, correspondence courses, and area conferences."

Two Problems.—Within the past 30 days Washington has considered two troublesome problems — truancy and juvenile delinquency. The first of these was taken up at the annual meeting of the National League to Promote School Attendance; the second, of course, at the publicized hearings of the Hendrickson Committee (of the Senate).

The remedies proposed to cure these evils ranged from a recommendation for a more liberal use of the "woodshed" to the establishment of "better emotional climates in the classroom." But Associate Superintendent Carl F. Hansen of the District of Columbia public schools proposed an off-the-beaten-track remedy, and at the same time struck off some sparkling ideas about the role of intelligence in the shop.

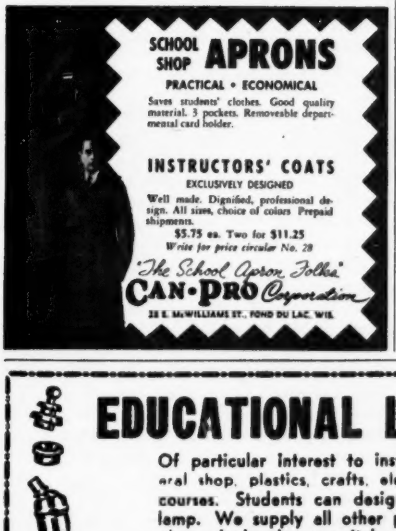
Provide for the child's intellectual growth, reestablish the primacy of intelligence, and many a juvenile problem will disappear, Dr. Hansen pleaded. And he went on to say: "Intellectual education is the right of every child." No question about it: Dr. Hansen had in mind the child in the shop as well as in the English class, for he went on to say:

"Isn't it true that the traditionalists and the classicists have the conviction that intellectual activity is chiefly literary analysis . . . How can we persuade people who have never tried to understand the workings of a television set that the man with a blueprint before him and screwdriver in his hand may be engaged in an intellectual process as difficult as trying to discover what Robert Browning meant in one of his more obscure lines? And that perhaps, in relation to what we do as human beings, the outcome is a good deal more important?

"What I am really pleading for is a democratization of intellectual education. I am sure that often the best thinking is done by the man in overalls and I am just as sure that he can profit from instruction in the best thinking that has been done by man through the ages." ★

Model Railroading *from page 8*

and after school for the best part of a school year. At present we have only a bare table with a minimum of rolling stock. But another year will bring another group of eager boys to carry on the work of adding details and learning the intricacies of operating a miniature railroad. Enthusiasm runs high so little motivation is needed and the boys get the invaluable experience of working together in a group for a common purpose. ★


SCHOOL SHOP APRONS
PRACTICAL • ECONOMICAL
Saves students' clothes. Good quality material. 3 pockets. Removable department card holder.
INSTRUCTORS' COATS
EXCLUSIVELY DESIGNED
Well made. Dignified, professional design. All sizes, choice of colors Prepaid shipments.
$5.75 ea. Two for $11.25
Write for price circular No. 28
"The School Apron Folks"
CAN-PRO Corporation
28 E. McWILLIAMS ST., FOND DU LAC, WIS.

America's Best Source of Supplies for Vocational Education and Crafts Classes

Larson Leathercraft

COMPLETE STOCK
Everything from Beginners' Kits of READY CUT projects, to supplies and leathers for advanced hobbyists.

HIGHEST QUALITY
All materials, moderately-priced tooling leathers, calfskin, etc., top quality.

Write today for FREE CATALOG

PROMPT SHIPMENT
Our established policy is to ship orders the same day we receive them.

J. C. LARSON COMPANY
820 S. Tripp Ave., Dept. 3407 Chicago 24, Ill.

PLASTICS
for SCHOOL SHOP WORK

Plexiglas sheets, rods, tubing.
Cellulose acetate, Vinyl sheets.
Foredom Tools and accessories.
Internal Carving Drills.
New Type Carving Dyes, Glues.
JEWELRY FINDINGS.

Everything for Industrial Art work, immediate delivery.

Send for our new school wholesale catalog, with project ideas, etc.

PLASTIC PRODUCTS CO.
371 South Main P.O. Box 1415
Salt Lake City, Utah

SEND FOR BIG 1954 CATALOG OF CRAFT MATERIALS

Materials and Tools for all popular School Crafts. Generous discounts on complete school requisitions. Write on school stationery for FREE catalog.

Plastics, leather, metals, textile paints, jewelry findings, cork projects and many more.

Craftsman Supply House
SCOTTSVILLE 4, N.Y.

STEP UP YOUR SKILL
with the Facts and Figures of Your Trade
To Earn More—Learn More

Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly Endorsed. Check book you want for 7 DAYS' FREE EXAM. Send No Money. Nothing to pay postman. ☐Carpentry $6 • ☐Auto $4 • ☐Oil Burners $1 ☐Sheet Metal $1 • ☐Welding $1 • ☐Refrigeration $4 ☐Plumbing $6 • ☐Masonry $6 • ☐Painting $2 • ☐Radio $4 ☐Electricity $4 • ☐Mathematics $2 • ☐Steam Engineers $4 ☐Machinist $4 • ☐Blueprint $2 • ☐Diesel $2 • ☐Drawing $1. If satisfied you pay only $1 a month until price is paid.
AUDEL, Publishers, Dept. V, 49 W. 23 St., N.Y. 10, N.Y.

EDUCATIONAL LAMP PROJECTS

Of particular interest to instructors—in woodworking, general shop, plastics, crafts, electricity, and many other shop courses. Students can design and make the body of the lamp. We supply all other parts necessary—sockets, cords, plugs, shades, harps, switches, etc. Over 700 different parts shown in wholesale catalog. A MUST for all instructors interested in keeping students occupied with *highly educational* and *useful* projects. Send 25c today for wholesale price list and parts catalog—refundable on first order.

THE GEARON COMPANY
Dept. 100-L1, South Desplaines Street, Chicago 6, Illinois

Darra James POWER TOOLS

Darra-James POWER TOOLS

Better Than Ever!

Better in every way . . . larger work tables . . . sturdier frames . . . newest mechanical improvements. Darra-James engineers are constantly working to give you more for your money.

WRITE for CATALOGS

Model 385C

TOOLKRAFT CORP
3000 PLAINFIELD ST.
SPRINGFIELD, MASS

The Commissioner Talks.—When a new federal commissioner of education is named—and there have been three within the past five years—he is besieged by reporters with questions designed "to make news." "Are you in favor of federal aid to education?" "Will you propose federal scholarships?" "Do you believe in progressive education?" Such questions succeed only in making the new official squirm in his seat or fall back on generalities. Either they are questions not politic to answer for a newcomer to Washington or else they are questions he will be able to answer only after several years in office.

This is by way of introduction to reporting the first talk we had with Samuel Miller Brownell, 53-year-old brother of the Attorney General, and thirteenth U. S. Commissioner of Education. We did not ask him too many loaded questions; we let him talk freely.

Dr. Brownell is a mild and pleasant-looking person who (and this is only a personal impression) would rather be in a classroom with a group of graduate students than in a budget room wrestling with appropriation estimates. But he has had both types of experiences.

He has served as school principal, school superintendent, college professor, university lecturer, and college president. This has given him a sense of the theoretical, a feel for the practical, and, above all, a broad outlook on education.

"I have great respect for vocational education," were among Dr. Brownell's first words to me—a respect apparently nurtured by the World War II record of the public vocational schools.

"In a sense all education is vocational," he continued. "Everybody is learning so he can become vocationally proficient. I don't draw a sharp line between vocational and general education."

As a national spokesman for education it was his responsibility, Dr. Brownell said, "to keep balance and perspective, not to go all-out in any one direction, and to keep vocational education within the total pattern of education."

Dr. Brownell comes from a "teaching family." His father taught at the State Teachers College at Peru (Nebraska) and later at the University of Nebraska. He himself entered the teaching profession at the early age of 22. It was natural, therefore, for Dr. Brownell to say:

"I regard my new job primarily as one of teaching. Teaching the people of the country about the needs and problems facing education. Teaching Congress concerning the role of the federal government. Teaching our own Office of Education staff how best to serve the states."

Dr. Brownell made it clear that by teaching he meant not indoctrinating or propagandizing, but rather helping people to get the facts, interpret those facts, and apply the interpretations to the solution of problems. Dr. Brownell knows the real spirit of teaching.

At this point we allowed ourselves one of the "news-making" questions:

"Who will be the next assistant commissioner for vocational education?"

"We are still looking," Dr. Brownell replied, "and as soon as the right person is found he will be named for the job. But it will probably be weeks before that happens."

"Will he come from the states or from within the Office of Education?"

"I am open-minded on that point," Dr. Brownell replied, adding that he likes to advance people within an organization, whenever possible. But career people, who have been devoting their time to one specialty within an organization, frequently are not as good for a top job as are outsiders with wider experience.

(*Continued on page* 38)

Index TO ADVERTISERS . . .

Please note: For further information from advertisers use those numbers listed in the column, *"Number to circle on the card."* Circle the corresponding numbers on the enclosed card for those companies listed below from whom you wish product information. You will receive the desired information promptly, and without further obligation.

	No. to Circle on Card	Page No.
Allied Radio Corp.	18	25
American Technical Society	2	2
American Type Founders	14	21
Armstrong Bros. Tool Co.	31	31
Atlas Press Co.	3	3
Audel, Theo, & Co.	61	39
Boice-Crane Co.	7	16
Brodhead-Garrett Co.	1	Cover 2
Cadillac Plastic Co.	30	31
Can-Pro Corp.	67	39
Carter Products Co.	49	37
Cincinnati Tool Co.	70	35
Columbian Vise & Mfg. Co.	69	35
Cope, D. W., Plastics	43	18
Craftsman Supply House	62	39
Craftsman Wood Service	37	33
Dearborn Leather Co.	55	38
Delmar Publishers, Inc.	33	32
Delta Power Tool Div., Rockwell Mfg. Co.	66	cover 4
DonJer Products	46	36
Electronic Instrument Co. (EICO)	38	34
Ford Motor Co.	8	17
Foredom Electric Co.	44	35
Fry Plastics Co.	12	22
Gearon Co.	59	39
General Binding Corp.	68	23
General Finishes Sales & Service Co.	53	37
Gilbert & Miller, Inc.	54	38
Gyro Lamp & Shade Corp.	48	36
Haag Machine Co., Inc.	9	37
Hardwood Corp. of America	27	29
Harper & Brothers	34	32
House of Plastics	39	35
Larson, J. C., Co., Inc.	64	39
L-W Chuck Co.	36	33
Mayline Co. (Engineering Mfg. Co.)	32	31
McEnglevan Heat Treating & Mfg. Co.	40	35
McKnight & McKnight Co.	28	30
Metal Goods Corp.	23	28
Nichols-Morris Corp.	6	6
Nolan Corp.	52	37
Norton Co.	29	31
Oliver Machinery Co.	25	29
Parent Metal Products, Inc.	51	37
Parks Woodworking Machine Co.	16	25
Paulson Mfg. Co.	45	36
Plastic Parts & Sales Co.	41	32
Plastic Products Co.	63	39
Plastic Supply Co.	56	38
Powermatic Machine Co.	50	37
Prakken Publications	35	33
Proto Tools Co.	26	29
Sams, Howard W., Co.	19	26
School Products Co.	57	38
Sheldon, E. H., Equipment Co.	13	20
Sheldon Machine Co.	10	19
Shell Oil Co.	11	22
South Bend Lathe Co.	65	cover 3
Stacor Equipment Co.	17	25
Stanley Tools	4	4
Starrett, L. S., Co.	15	24
Sturtevant, P. A. Co.	42	18
Telephone Engineering Co.	58	38
Toolkraft Corp.	60	39
Transilwrap Co.	20	27
U.S. Burke Machine Tool Co.	22	27
Vyke Brake Co.	47	36
Walker-Turner Co., Inc.	5	5
Weldit, Inc.	24	29
Winsted Div., John H. Graham & Co., Inc.	21	27

Get These Free-Loan SOUTH BEND Models . . .

SIMPLIFY YOUR SHOP PLANNING

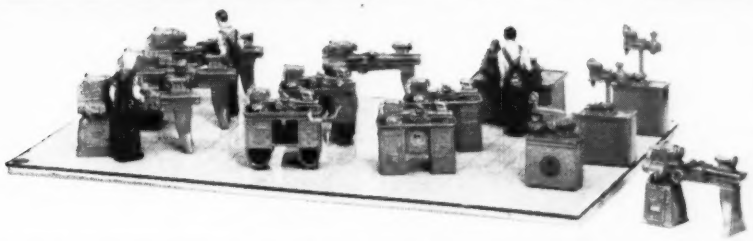
Here's the easy, practical way to re-arrange your shop or plan a new one without guesswork and trial-and-error labor.

Just mark your floor dimensions on the scaled planning sheets, furnished with the kit. Then, select the scale models of the machine tools the shop will contain. Move them around until you get the best possible arrangement. Since everything is to scale ($3/4'' = 1'$) this 3-dimensional planning definitely establishes your working plan. You know exactly what you are going to have before the first machine is spotted. Space utilization, traffic patterns and work areas are determined exactly.

The kit contains 23 scale model machine tools and planning sheets for rooms up to 39′ x 56′. It's yours to borrow for only the cost of transportation. Save yourself time and effort by sending for it now.

Teaching Helps

These aids will make your teaching easier. Handbooks on the operation of lathes, drill presses and shapers. Book on projects. Wall charts. 16 mm. sound films in full color on "The Metal Working Lathe," "Plain Turning" and "Grinding Cutter Bits." Sample copies of all printed material free to shop instructors or supervisors. Films available on free-loan basis, borrower pays transportation.



SOUTH BEND LATHE South Bend 22, Indiana

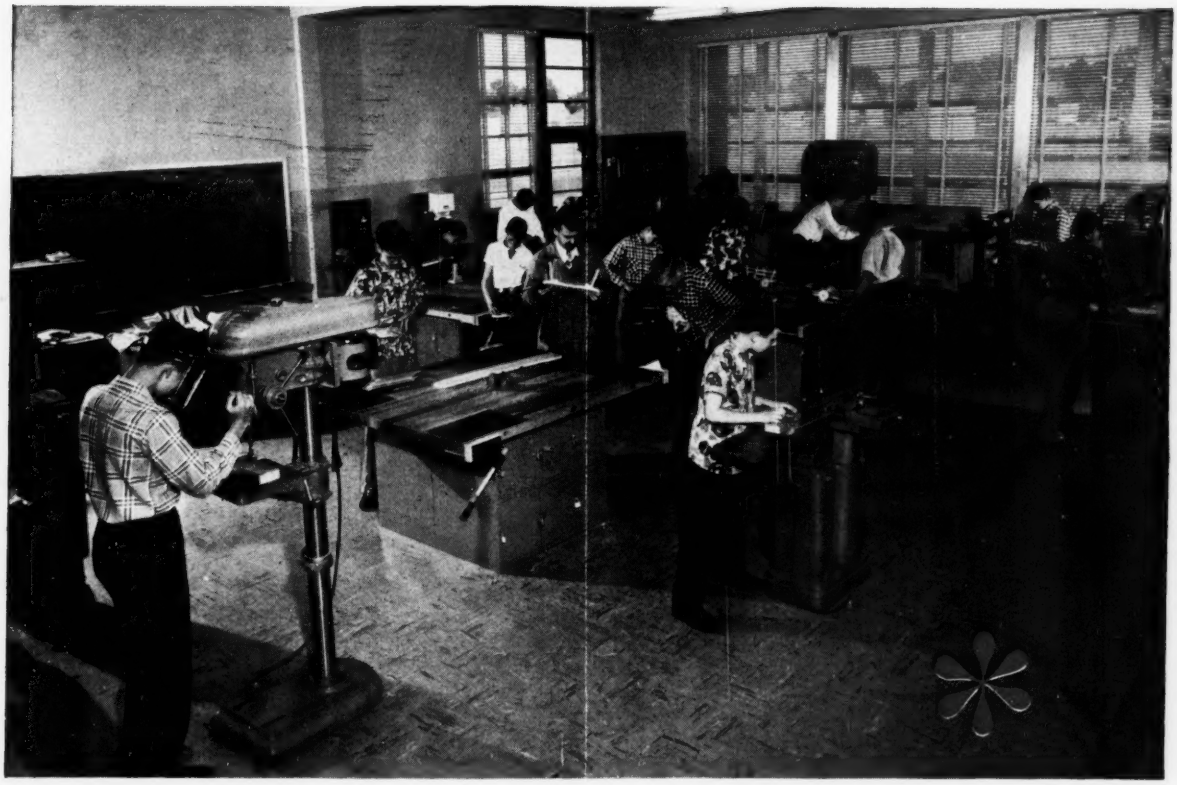
Please ship your Shop Model Kit to address below, express collect. I wish to borrow the kit for approximately_____days, and agree to return it to you, express prepaid, at the end of that time. Shop being planned is to be located at_____. I understand there is to be no charge for the loan of this kit, other than the transportation costs which I am to pay.

SCHOOL_____

STREET ADDRESS_____

CITY_____ STATE_____

BY_____ POSITION_____



DELTA The "Natural Choice" at new East Lake Junior High School

"With their ease of operation and built-in safety features, DELTA power tools just seem to be made for school shops," says Mr. Henry Roy, shop instructor, commenting on the purchase of Rockwell-built DELTA Tools for East Lake Junior High School, Massepequa Park, N.Y. Ultra-modern East Lake has one of the most complete power-tool equipped shops in the nation. "DELTA was the natural choice," says Mr. Roy.

Heavy schedules, both day-time and evening, demand durable equipment, and, according to Mr. Roy, "DELTA tools require only a bare minimum of maintenance, permitting us to keep them running constantly."

"Students too, are enthusiastic about DELTA tools," reports Mr. Roy. "They appreciate DELTA'S clean, accurate cuts on wood, plastics and other materials."

You'll find DELTA a wise investment for your school, too. The inherent safety, simplicity, and extremely low operating cost that make DELTA Power Tools the leader in industrial and home workshop use, also make them the "natural choice" for industrial arts instruction.

Get full information from your DELTA Dealer, or send the coupon today.

DELTA QUALITY POWER TOOLS

Another Product of **Rockwell**

*

DELTA Power Tools were the "natural choice" for students at new East Lake Junior High School, Massepequa Park, New York. Included are: a 14" and a 17" Drill Press; a 14" and a 20" Band Saw; a 24" Scroll Saw; a 10" Tilting Arbor Unisaw; an 8" Jointer; two Tool Grinders; a 12" Lathe; and a 6" Belt Sanding Machine.

DELTA QUALITY MAKES THE DIFFERENCE

DELTA

DELTA POWER TOOL DIVISION,
Rockwell Manufacturing Company
412-A North Lexington Avenue, Pittsburgh 8, Pa.

☐ Please send complete Delta Catalog.
☐ Please send name of my nearest Delta Dealer.

Name_____ Position_____

School_____

Address_____

City_____ Zone____ State_____